



# **NPPD Public Opinions on Carbon Emissions Qualitative Research**

## **SUMMARY REPORT August 2021**

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## 1.0 Background and Methodology

NPPD conducted a series of public meetings in August of 2021. The purpose of the meetings was to seek input into NPPD strategic planning and more specifically the business risk of carbon and NPPD's carbon directive. The meetings were facilitated by Brad Kitchens, President and CEO of ScottMadden, Inc. and presentations on the Priorities of Electricity Service and Business Risks of Carbon and Decarbonization were made by the Energy Power Resource Institute (EPRI). A list of the locations of the public meetings and approximate number of attendees is listed below.

- Norfolk 8/11/21—125 participants
- Seward 8/12/21—85 participants
- North Platte 8/16/21—145 participants
- Scottsbluff 8/17/21—45 participants
- Kearney 8/18/21—145 participants
- General Customer Meeting 8/20/21—65 participants

The meetings were recorded and the MSR Group was contracted to transcribe the public comment sections and to identify general themes voiced during the public comment periods. A copy of the transcripts can be found in section 3.0. The general themes gleaned from the transcripts are summarized in section 2.0. The themes are not presented in any particular order and the nature of this task required a certain level of arbitrary decision making related to identifying themes and choosing which attendee comments to offer as supporting evidence.

There was no attempt to try and quantify the public comments as reliable frequencies and percentages can be attained by reviewing the polling results conducted during the public meetings and gathered through a web survey made available to all interested customers.

## 1.1 Infographic

# INFORMATIONAL FORUM POLL RESULTS

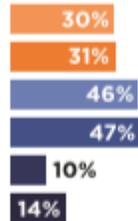
■ Norfolk 
 ■ Kearney 
 ■ Scottsbluff 
 ■ Seward 
 ■ North Platte 
 ■ NPPD Customer Meeting

### Of the topics presented, what is the topic you are most interested to hear about?

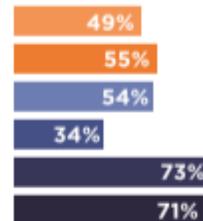
Risk associated with being a carbon emitting utility



What NPPD's carbon reduction goal should be

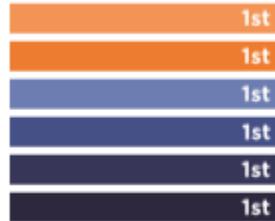


What principles (cost, environmental, reliability, resiliency) are most important to customers.

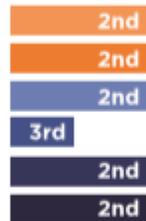


### Please rank the following core objectives on what is most important to you:

Reliability/Resiliency



Affordability/Cost

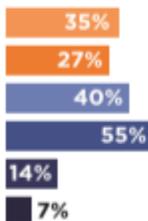


Environmental Impacts

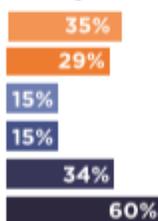


### Based on what you have heard, what concerns you most about decarbonization?

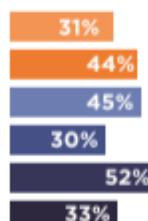
The risks of doing nothing



The risks of not knowing how we will get there

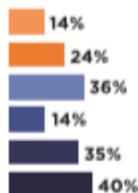


I am not concerned about decarbonization

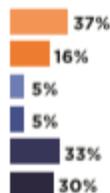


### In your opinion, has NPPD done enough to diversify their energy resource mix?

Too ambitious



Doing more than enough, but not too ambitious



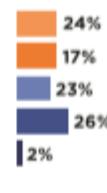
About the right pace



Not doing enough, but not too far behind



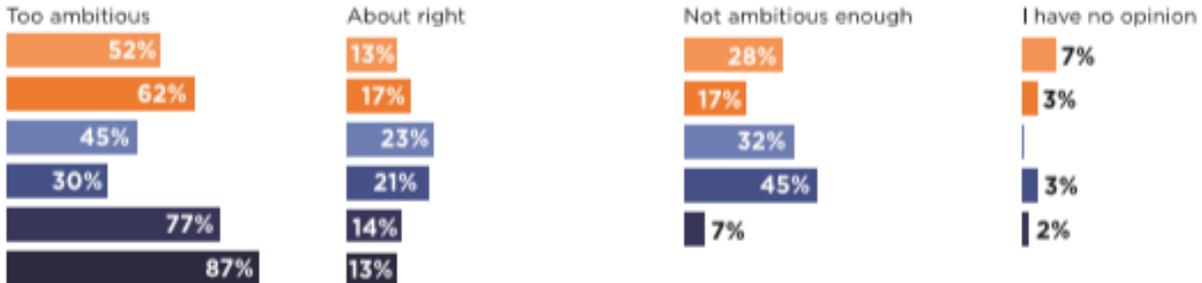
Far behind where it should be



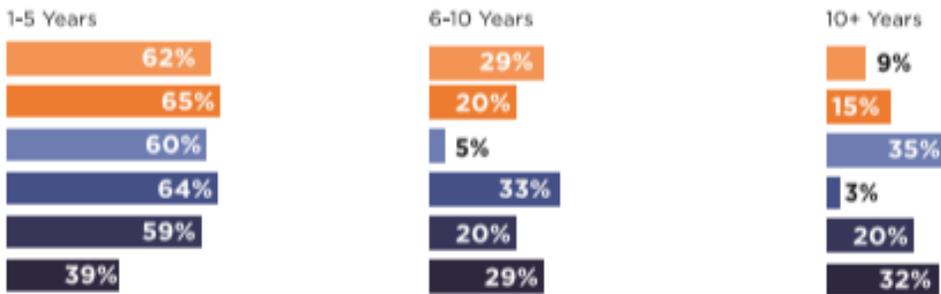
I don't know



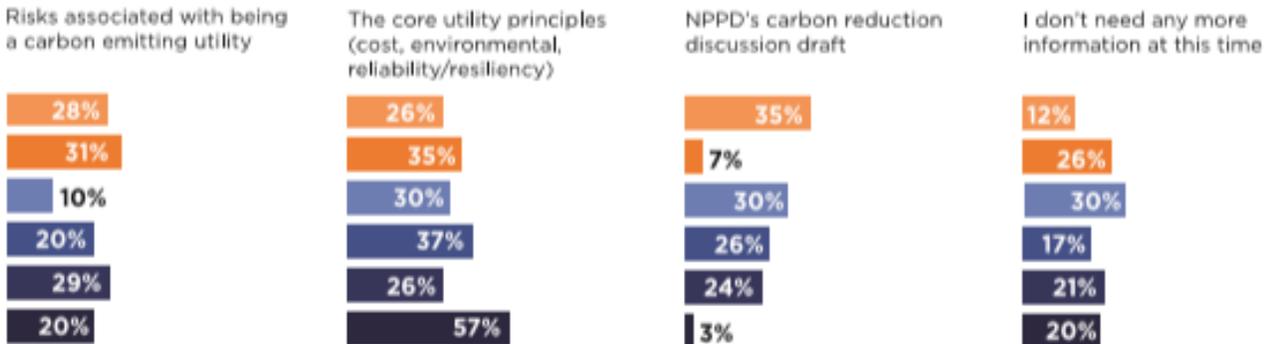
**In your opinion, is a net-zero decarbonization goal by 2050:**



**The goal presented is a 30-year aspirational goal, how often do you think the goal should be formally re-evaluated by the Board?**



**Of the information presented tonight, what do you feel you need more information on:**



**Enter one word that comes to mind when you hear the word “Decarbonization”.**

Norfolk



Kearney



Scottsbluff



Seward



North Platte



NPPD Customer Meeting



## 2.0 Key Themes from Public Comments

### 2.1 Ensuring Reliability/Resilience is Paramount

The primacy of energy reliability and resilience was consistently raised at all the public meetings. Resilience was defined as ensuring dependable energy output, regardless of uncontrollable factors attempting to disrupt it. Reliability and resilience polled higher than affordability and environmental impacts. Several participants pointed to the Texas energy crisis earlier in the year as heightening their concern for reliability and resilience.

*“I’ve got a 90-year-old mother still lives at home by herself. She, at that age, needs reliable power. She needs her air conditioning in the summer, and she needs her heat in the winter. She can’t withstand blackouts like we had in February. So now if we decide, or if the board would decide to close down Gerald Gentleman Power Station, we’re really going to have problems covering the load.”— Dan Sheer, St. Paul, Howard Greeley Rural Public Power District, Kearney Meeting*

*“Watching the presentations here, I tried to keep track of the slides and the number of times the presenters mentioned reliable, and I marked down seven, and one time was service, which I would relate to reliable. If everyone kind of remembers back to mid-February, what happened there? There’s the discussion, on the one pie chart, if somebody could answer that, it says 6.2% of the [total output] production is from wind.”— Dean Smith, Brunswick, Nebraska, North Central Public Power, Norfolk Meeting*

*“I guess with piquing thoughts about the February blackouts that we had pretty much because of lack of generation because of all different concerns, but we didn't have enough generation to cover the load. That's why we had the blackouts...most of all, these meetings that you've had so far, I think the majority is saying, 'No, we're not worried about de-carbonization. We're worried about reliability.' And so that's where I stand.”— Dan Sheer, St. Paul, Howard Greeley Rural Public Power District, North Platte Meeting*

Several participants expressed concerns that reliance on renewable energy would negatively impact overall power reliability of energy production. In some cases, it appears that several participants were confused over which technologies are properly classified as “alternative”.

*“The number one and number two concerns from the customers of the state of Nebraska is reliability and affordability. What renewable Energies do is make those two things in jeopardy.”— Michael Cumm, Wausa, Cedar Knox Public Power District, Norfolk Meeting*

While reliability/resilience is one of the greatest concerns to NPPD’s customers, other participants provided caveats when prioritizing reliability above all else and encouraged caution when doing comprehensive and long-range planning.

*“Does NPPD then become a net purchaser of electricity from SPP market, rather than a net seller? Does that pose some kind of a risk and detriment to our customers...we have required elements within the state, as far as the utilities, yes, providing reliable energy and affordable...Be aware of, if you're trying to do something too quickly, there are consequences always when we do things like that.”— Jan Bostelman, Brainard, Butler Public Power District, Seward Meeting*

*“So how are we going to make sure, can't eliminate all the risks, but how are we going to make sure—this hasn't happened just once it's happened a couple of times already. So, how are we going to meet that demand in the future? ...As you have to have that base load generation you have to have that reliable energy, you have to have that energy that is available and what that energy might be I think that's something that's worth discussing.”— Bruce Bostelman, Brainard, Butler Public Power District, Seward Meeting*

## 2.2 Importance of Affordability

Energy affordability was consistently identified as a key priority for Nebraska energy planning. Many participants spoke of the burden that high energy costs placed on lower income households and their ability to absorb any future increases. It was pointed out that NPPD, as a public utility, has a special responsibility to minimize fees for low-income residents.

*“Most of the housing that we do is for people who are living at 60% of very immediate income or below, many of them are at 30% of very immediate income or below. So, I try to be sensitive to their affordability side of things, because those people are the first ones that are hurt.”— Cliff Messner, Central City, Central City Power District, Seward Meeting*

*“And again, for the poor and for everyone actually, it’s important to keep our taxes as low as possible.”— Dave Mirman, Glenville, Southern Power District and South-Central Public Power District, Kearney Meeting*

Several participants pointed out that alternative energy sources could prove affordable. Several stakeholders expressed their desire to develop energy sources in Nebraska to generate local revenue as opposed to importing resources, such as coal, from other states.

*“Actually, clean energy can reduce property tax burden for Nebraskans. Every year, nearly 12 million in property taxes is being generated from clean energy sources in Nebraska. In our neighboring state of Iowa when companies paid 69.5 million in state and local taxes. There is something to think about. Also, clean energy can be cost effective more than fossil fuel. NPPD could actually decrease carbon emissions by 90%, without adding any expense to taxpayers.... In 2019 100% of Nebraska’s coal was shipped from Wyoming. Rather than doing this, let’s spend our money in our own state. We can develop our own energy and keep that money right here in Nebraska.”— Bonnie Cruz, Seward and Norris, Seward Public Power Company, Seward Meeting*

*“I’m a little tired of sending all of our money to Wyoming. We have the resources here. I would just assume that we keep our energy dollars in the state of Nebraska. That’s my view.”— Rick Yoder, Cass County, Norfolk Meeting*

Other stakeholders argued that the need for affordability should be balanced with the need to decarbonize for the good of the environment.

*“My speech to you is not how to make money, but to tell you to take action and move quickly to renewable energy...the affordability part should be last and I’m glad it was tonight. We know if we don’t spend it now to decarbonize fast, it will cost much more in the future, in money and in all the lives. All across the world, we have a shared concern, our lives, and we need to address climate change to improve all of our lives. Please do everything, including raising the rates of higher income people and large users of electricity, the companies, to get the renewable energy and shut down the coal plants.”— Ann Debreeze, Cortland, Norris Public Power, Seward Meeting*

*“But I think if you back out a little bit and look at cost to society, not just cost to the customer, I mean, in the end it is the cost to the customer. Climate change is a cost to society, right? And so if you put the cost that fossil fuels have to society, if you include that in the equation, it’s going to change your dynamics between those variables.”— Steve Welch, Chadron, Scottsbluff Meeting*

*“I would just like to point out that some folks have brought up a concern around the idea that maybe speakers so far discounted costs more than they should...One thing we can all agree on is that what we don’t like to see is small ineffectual actions smattered around that get lost in the aggregate. That doesn’t help anybody.”—Nick, Wink, LES, Seward Meeting*

Still other participants felt further efforts to decarbonize were not warranted due to higher costs of production.

*“But the people here most likely don't want to check that box for double the price of electricity and less reliability. That's not the business we're in. Give people a choice. Let the economics of it drive the decisions of the board.”— Josh Friesen, Wallace, Southwest and Midwest Electric, North Platte Meeting*

*“I really feel like the U.S. has done enough to decarbonize already, and look at the amount of money we were spending for all of these meetings, all of these discussions and all of the closing of coal fire plants to decarbonize while we're a small portion of worldwide. I just think we're financially hurting this country while China and Russia just continue to pump CO2 in the atmosphere.” – Dan Sheer, St. Paul, Howard Greeley Rural Public Power District, Customer Meeting*

*“We were about the 35th or 40th in the United States with settling power plant or a burning power plant. Most efficient one in the United States also. So you can understand the poll. I heard about affordability. It's not affordable. We all know it survives on our taxpayer subsidies. That's why it takes first demand and the first place in the power pools, because it's low cost due to subsidies. That's not long-term because the windmills themselves are not reliable and long-term and they take a lot of carbon to build. We all know that. It's not reliable. Last winter's freeze told us that. There's a power plant 20 miles from here. Cooper kept 14 states lit and in heat.” – Mike Groene, Lincoln County, North Platte Meeting*

### 2.3 Support for Decarbonization and Alternative Energy is Mixed

Several participants spoke passionately in favor of alternative energy and decarbonization. Several expressed that it should take precedence over costs.

*“My speech to you is not how to make money, but to tell you to take action and move quickly to renewable energy...the affordability part should be last and I'm glad it was tonight. We know if we don't spend it now to decarbonize fast, it will cost much more in the future, in money and in all the lives. All across the world, we have a shared concern, our lives, and we need to address climate change to improve all of our lives. Please do everything, including raising the rates of higher income people and large users of electricity, the companies, to get the renewable energy and shut down the coal plants.”— Ann Debreeze, Cortland, Norris Public Power, Seward Meeting*

*“The coal plant powered by NPPD is the largest source of air pollution at Lincoln. So, I'm literally breathing pollution as I walk to class. And another point, is that there were 206 countries that competed in the Olympics. And the fact that only one of those countries puts 15% of emissions into the atmosphere, is a lot. And China maybe the first, but we are second. Double the amount of India and triple the amount of Russia, which are third and fourth and then seven times the amount of our neighbor, Canada and 15 times the amount of Mexico. Any planner policy that does not include emission cuts at the source is completely inefficient for the future ahead of us.”— Kat Warner, Plattsmouth, NPPD, Kearney Meeting*

Several participants vocalized concerns for continued dependence on fossil fuels due to the perceived negative impact on the environment and higher costs compared to some alternative energy sources.

*“But I think if you back out a little bit and look at cost to society, not just cost to the customer, I mean, in the end it is the cost to the customer. Climate change is a cost to society, right? And so if you put the cost that fossil fuels have to society, if you include that in the equation, it's going to change your dynamics between those variables.”— Steve Welch, Chadron, Scottsbluff Meeting*

*“Climate experts and energy experts agree that fossil fuels are no longer going to be realistic or economically viable. And this is something that I'm learning about every week in my classes. I'm an economics major, I hear about this all the time. I attend economic seminars and I hear this in every single one of them, because it's such a large topic.”— Kat Warner, Plattsmouth, NPPD, Kearney Meeting*

*“Especially when the reports from the two consultants that NPPD paid thousands of dollars for, so the sticking with fossil fuel resources for the long haul would cost more money for us as repairs than clean energy and that's literally on the website. And then along with that, if you go to spp.org and scroll down just a little bit, you can watch a minute-by-minute energy generation. And if you pay attention and check throughout the day, you'll see that when wind energy is highest, cost of energy is the lowest. And that's because the market is shifting away from coal into wind.”— Kat Warner, Plattsmouth, NPPD, Kearney Meeting*

A few participants pointed out that alternative energy has the potential to reduce tax burdens and generate jobs in Nebraska.

*“Actually, clean energy can reduce property tax burden for Nebraskans. Every year, nearly 12 million in property taxes is being generated from clean energy sources in Nebraska. In our neighboring state of Iowa when companies paid 69.5 million in state and local taxes. There is something to think about. Also, clean energy can be cost effective more than fossil fuel. NPPD could actually decrease carbon emissions by 90%, without adding any expense to taxpayers.... In 2019 100% of Nebraska's coal was shipped from Wyoming. Rather than doing this, let's spend our money in our own state. We can develop our own energy and keep that money right here in Nebraska.”— Bonnie Cruz, Seward and Norris, Seward Public Power Company, Seward Meeting*

*“I'm a little tired of sending all of our money to Wyoming. We have the resources here. I would just assume that we keep our energy dollars in the state of Nebraska. That's my view.”— Rick Yoder, Cass County, Norfolk Meeting*

Despite many positive comments, some stakeholders discounted renewable resources due to higher costs and decreased reliability.

*“But the people here most likely don't want to check that box for double the price of electricity and less reliability. That's not the business we're in. Give people a choice. Let the economics of it drive the decisions of the board.”— Josh Friesen, Wallace, Southwest and Midwest Electric, North Platte Meeting*

*“We were about the 35th or 40th in the United States with settling power plant or a burning power plant. Most efficient one in the United States also. So, you can understand the poll. I heard about affordability. It's not affordable. We all know it survives on our taxpayer subsidies. That's why it takes*

*first demand and the first place in the power pools, because it's low cost due to subsidies. That's not long-term because the windmills themselves are not reliable and long-term and they take a lot of carbon to build. We all know that. It's not reliable. Last winter's freeze told us that. There's a power plant 20 miles from here. Cooper kept 14 states lit and in heat.” – Mike Groene, Lincoln County, North Platte Meeting*

*“I really feel like the U.S. has done enough to decarbonize already, and look at the amount of money we were spending for all of these meetings, all of these discussions and all of the closing of coal fire plants to decarbonize while we're a small portion of worldwide. I just think we're financially hurting this country while China and Russia just continue to pump CO2 in the atmosphere.”– Dan Sheer, St. Paul, Howard Greeley Rural Public Power District, Customer Meeting*

## 2.4 Climate Change is an Urgent Matter for NPPD to Address

For several customers climate change represents an existential threat to themselves as well as the world. For these individuals, concern over climate change trumped all other concerns, including production costs and reliability.

*“The speakers provided industry talking points, aim to help a business make money, but lack the urgency that we need to hear. The economics of providing renewable energy obviously considers the fuel cost is zero for renewables. The affordability of it right now should not be a factor and it needs to take a back seat to the urgency of getting up as much renewables as possible now.” – Ann Debreeze, Cortland, Norris Public Power, Seward Meeting*

*“I'd like to know how much of that reduction was caused because a high portion of our manufacturing was moved to China. We reduced our emissions because our manufacturing left the country. So that had a big impact on our emissions. Is that ever factored into those numbers? We're told about electric cars. It's my understanding that China controls about 70% of the rare earths in the world. Who's going to make the metals for the batteries? It's not going to be the United States.” – Ed Beeker, North Platte, The Municipal Light & Water, North Platte Meeting*

A few participants spoke on the negative impact of climate change on low income and communities of color.

*“The truth is, climate change is also a racial justice issue. It disproportionately affects marginalized groups because of redlining Jim Crow laws. It disproportionately puts these people farther away from grocery stores, hospitals and schools in areas that are at higher risk of floods and hotspots.” – Lauren White, Wayne, WAPA and NPPD, Norfolk Meeting*

*“NPPD is a public owned power company. And for them to not care about the cost to the public would not be very feasible. We just come out of COVID with the pandemic. A lot of small businesses have suffered. A lot of families have suffered. The cold spell that we had in February with the Texas situation put added costs onto our electric bills. And for people to say that they don't care about the costs to lower income families. I don't really feel that would be a good stance for NPPD to become public with.” – Julie Condon, Lincoln, LES, Seward Meeting*

## 2.5 Participants Expect NPPD to Take the Lead in Energy Policy

Participants expressed the need for, and support, for NPPD to lead on energy issues for Nebraska. For these participants, leadership includes ongoing communication, education and follow through.

*“I am here to remind our board members that you were elected to your position to learn the facts and make educated decisions. We poured our trust in you when you were elected to make the decisions that you've learned to be best through listening to experts. So please vote as if you were my age, because at one point you were and another point, I will be yours doing the same for the next generation.”— Kat Warner, Plattsmouth, NPPD, Kearney Meeting*

*“I would like to know specifically why is it that we we're told as citizens and residents in our area here, that they were going to loop their excess hydrogen over to Sheldon and stop the coal burning at Sheldon. We all know the facts, it hasn't happened, and it isn't going to happen evidently, but I would like you to shed light on this for us all.”— Ken Yates, Hallam Norris, NPPD, Seward Meeting*

Throughout the group discussion, individuals classified NPPD as a leader. Within this leadership role, constituents requested NPPD to address the growing concerns of climate change and the necessity for decarbonization.

*“There must be leadership in addressing climate change because my generation cannot afford for things not to change. Other generations have failed us by not adequately addressing this problem, but the failures of the past don't have to define the future. Change happens through leadership, which many of you know, which is why you're on the board and in this room.”— Kat Warner, Plattsmouth, NPPD, Norfolk Meeting*

*“So, regardless of the risks, regardless of how scary it might sound, regardless of how the technology doesn't seem immediately there to live out the goal, I strongly support you considering making the kind of goal that the Lincoln Electric System made. We absolutely need your leadership.”— Reverend Penny Greer, Lincoln, LES, Seward Meeting*

Some expressed hope NPPD's leadership could advocate for cleaner energy which they believe can both generate new jobs and create a healthier environment.

*“Other highly developed countries have already begun the transition to carbon neutrality, but we can lead as a state in the innovation of clean energy. We have a fantastic potential. Investing in clean energy in Nebraska not only protects the environment, it creates more jobs, healthier communities.”— Lauren White, Wayne, WAPA and NPPD, Norfolk Meeting*

It is important to recognize that not everyone understood the drive for carbon neutrality or the term decarbonization, however, all recognized the role NPPD should play in defining the issue and creating options.

Some attendees pointed out that trust in NPPD leadership could be undermined if NPPD fails to listen to customers and then follow up and share how the input was used or not used.

*“That reminds me of three years ago when you and your staff were telling people...to come to these meetings and you would listen to them, and things would... you'd take all that under advisement for the 345K high voltage transmission line known as the R project. That didn't happen. You had it all in your mind already what you were going to do. And I'm concerned about if you have it all in your mind right now of what you're going to do. You've given this too many times and tried to make it all look nice, following all the rules, but then you don't take it under advisement.”— Twila Whipp, Bedford, Custer Public Power, North Platte Meeting*

## 2.6 Satisfaction with NPPD's Energy Management and Leadership

There were several individuals who praised and thanked NPPD for its leadership throughout the group meetings. Others expressed the opposite opinion.

*“The last I heard, we have about a 250-to-300-year disposal of coal at our readiness to use on our coal fire generation plants. With NPPDs' great work on what they have done to control the CO2 in the carbon emissions in the coal plants, has been immersive.”— Judy Rican, Polk County Power District, Kearney Meeting*

*“Public power in Nebraska has a great history. I get goosebumps when I talk about it because I know the history of it. I know what it means. I know where we've been with our good relationship with NPPD and we want to continue that.”— Judy Rican, Polk County Power District, Kearney Meeting*

Many customers appreciate NPPD's willingness to educate, inform and involve customers.

*“I just wanted to say, just begin to say really, I thank you for coming out here and actually also coming out here with the slides and everything and places to take notes. It really looks like you're taking this seriously. There have been a lot of cases where it just seems like people come out and it's just a PR exercise. I really appreciate you taking that seriously. So, I want to just say thank you guys because I know that's kind of tough to come out here.”— Daniel Bowen, Chadron, NPPD, Scottsbluff Meeting*

Conversely, other participants doubted NPPD's ability to balance competing priorities.

*“What's your reasoning? Some guy stands up here and says, 'It's a done deal. We're going to decarbonize.' I haven't heard that. I haven't heard from the owners that they want to do that. And that's the people of Nebraska. So that's my concern. Tell us what you want to do. We might turn around and tell you what we're going to do. Some of you won't be on the board next year.”— Mike Groene, Lincoln County, North Platte Meeting*

While there were negative comments targeting NPPD's performance, there were rebuttals made in support of the advancements they have made as a public power company.

*“First of all, I disagree with [the previous comment] on many aspects.... I want to thank NPPD greatly for what you're doing. We as a community, do not know how efficient or how lucky we are to have Nebraska Public Power. Do you people realize that we produce more electricity than we use? Is that*

*not true, Sir? And that is sold on the open market, what we don't use, is that correct, Sir? That's a fact.”— Ronald Jones, North Platte, Municipal Light and Water, North Platte Meeting*

## 2.7 Support for the Need to Re-evaluate Power Generation Mix

Many attendees expressed support for re-thinking the power generation mix and believe flexibility and change is central to good power planning. The reasons offered for re-thinking power generation and the preferred mix varied greatly.

Some individuals mentioned the necessity of keeping energy generation within Nebraska, rather than investing in coal elsewhere. Others advocated for greater support for grid independence.

*“Setting a decarbonization goal is common sense. By the end of 2019, there are nearly three times as many jobs in Nebraska in the clean energy generation sector as is fossil fuel generation sector. In fact, wind technicians are the top of the list for fastest growing occupations in the United States. Right now, we are sending money, jobs and tax revenue out of state to buy coal when we could be generating homegrown Husker Energy.”— Kat Warner, Plattsmouth, NPPD, Kearney Meeting*

*“That's my biggest issues. We need to have a diverse plan of action. This is a diverse plan of action. Just like your portfolios are diverse, NPPD needs to be diverse. One other thing, my grandpa was a dairy farmer in the Sandhills, pasture raised him. All his water came from the Ogallala Aquifer from a windmill. Those cattle never starved. They never were thirsty.”— Eric Davis, Kearney, NPPD, Kearney Meeting*

*“We're seeing a growing number of customers coming to us and saying, I want to go off the grid, or I want to do self-generation. And some of this stuff is going to move forward with, or without us. We had a customer call us this spring saying, I want to go off grid. We said, well, it's expensive. It doesn't make a lot of sense. The response was, we've got \$5 million to spend on it. We already have a gas generator backup. Can you get us there?”— Cliff Messner, Central City, Central City Power District, Seward Meeting*

There were many concerns raised about wind energy related to cost and reliability. Attendees also suggested that windmills require a considerable amount of carbon to produce. Similar concerns were raised about other forms of production.

*“To the taxpayer, it's 500 million. It's really hard to get good numbers when you're talking about wind turbines. Now, the next step is a possible 30% investment tax credit. Let's just take that and pull another 150 million off of that thing. That brings our costs down to 200 million. Now, a year has passed, we're in the 50% tax bracket and high-income investors invest in these things because they can fully depreciate their depreciable costs, that 350 million. They can do that one year. That saves them half of that in taxes if they're in the 50% tax bracket, that's 175 million of tax savings to subtract from your \$200 million cost basis at this time. That means you've got to go to the bank and borrow 25 million to build a \$500-million wind farm.”— Doug Nelson, Wayne, Northeast Nebraska Public Power, Norfolk Meeting*

*“In the next few years, as we go to electric cars, it looks to me like we're going to go to electric or hydrogen-based iron and steel manufacturing, and all kinds of other things. And this is going to put tremendous pressure on supplying EV connections; it's going to be a tremendous amount of pressure on putting in a very flexible transmission system. And how is all of this going to fit together? I'm really concerned how we're going to get carbon free. Much more energy to keep us going.”— Roger Wess, NPPD, Scottsbluff Meeting*

*“...but if we're not saving coal, why are we having all the windmills out? I mean, Gerald Gentleman was running all the time, burning coal all the time because we have to have electricity in the system. So, if the wind goes down, we don't have brownouts. So, what good of are they? Why do we keep putting them up?”— Randy Herbert Ravenna, Kearney Meeting*

*“First, I'd like to applaud the carbon reduction outlined in the slides. I think that's really impressive. The big thing that impresses me there is the lack of change in the generation mix at NPPD. We still have 42% of our generation coming from coal if I read the slide correctly. I am concerned about the decommissioning cost. And I think there needs to be a public discussion on the decommissioning cost of wind turbines and solar power. I know that's coming down the pipeline. In the SPP, I'm curious as to how NPPD compares to their peers throughout the market with respect to generation.”— Matt Kibbon, North Platte, North Platte Meeting*

## 3.0 Verbatims: Transcriptions

### 3.1 Norfolk

Timothy Arlt: Can you hear me, Mike?

Brad Kitchens: We plan to get started in just about five minutes.

Timothy Arlt: Sound check, sound check.

Brad Kitchens: [crosstalk 00:00:20].

Timothy Arlt: Are you ready, Mike? Okay. Hey, we're going to go ahead and get started. So, if you could take a seat, we'll get going here tonight. Good evening, on behalf of the NPPD Board of Directors, management and staff, welcome. We certainly appreciate all you taking the time from your busy schedules to come out and attend this and engage with us on this important effort. Before I get going, I just want to do a quick safety brief. If we happen to hear the fire alarms go off in the building, we're to exit out the door to the back, okay? If by chance a tornado happens, which I seriously doubt, they do have shelters which are the restrooms. And then there's an AED, if someone by chance becomes ill and needs some help, it's over by the restrooms. And I would ask Jennifer to make sure you call 911 if we need it, okay?

Again, welcome. My name is Tim Arlt, I'm the vice president of Innovation and Corporate Strategy at NPPD. We have some housekeeping items we want to cover with you, and then we'll get into the entire effort here this evening. We do have nine board members present today, constituting a quorum of the board. So, we are considering this a public meeting under the Nebraska Opens Meeting Act. Therefore, in accordance with state law, the Opens Meeting Act, it's posted near the main entrance of the meeting room, it's right outside on the table. Copies of the meeting agenda are also available near the entrance of the room. Notice of the date, hours, locations for the meeting was also published in eight area newspapers around August 5th.

So, some quick facts here about NPPD. NPPD is Nebraska's largest generation and transmission utility. We are also a political subdivision of the state. Our operating revenues are about \$1.2 billion a year. We own and operate 31 generation facilities providing 3,600 megawatts of diverse generation. And for some scale, the city of Norfolk, this community that we're in tonight, peaks at about 85 megawatts. So, we generate and operate 36,000 megawatts. We also own and operate over 7,800 miles of transmission and distribution lines, serving all our parts of 86 of the 93 counties in the state. We're a power provider at wholesale and at retail to 403 of Nebraska's 530 communities. We work in partnership with other utilities across the state to serve more than 600,000 Nebraskans.

We're governed locally by an 11-member elected board of directors. Our mission is to safely generate and deliver reliable low-cost, sustainable energy and related services while providing outstanding customer service. So based on our 2022 proposed rate schedule, wholesale customers will experience no base rate increase for the fifth consecutive year and our retail customers for the ninth consecutive year. Public power in Nebraska provides rates that are competitive and low nationally. Nebraska's residential rates

were ranked the eighth lowest in the nation according to the latest energy information, administration information. NPPD residential rates are below the state average. NPPD strives to power our local communities and find innovative practical solutions to environmentally, social and community needs.

We are not-for-profit, controlled locally and focused on our customers. We would not exist without you, our customers. So why are we here tonight? So really, it's to start the conversation and get input from the public surrounding the value of public power in Nebraska. NPPD's current and future generation mix and the state of decarbonization as we prepare our next Integrated Resource Plan to be completed by the spring of 2023. NPPD's board continues to move forward with the development of a sustainable carbon emission's reduction strategic directive, we call that SD-05, that will include a carbon reduction goal for the district. NPPD is committed to seeking customer feedback as a not-for-profit public entity of the state, which is governed by local constituents. We aim to operate with transparency and open communication at all times.

This is the first of five public forums we're holding around the state to gather input from customers. So, you're the alpha version, thank you for coming. Conversation today will be specifically centered around the risk of being a carbon emitting utility, how NPPD's carbon reduction goals should be structured and what principles, reliability, resiliency, affordability, environmental impact are most important to maintain as NPPD works to reduce its carbon emissions. So, what are our goals for tonight? These topics are very complex. Our goal is to give you a good general understanding of them, so you can provide u with valuable informed feedback. We ask that you try to hold your questions until after the presentations to ensure that we get through all the material. Please take what you learned tonight and apply it to this initiative by completing the survey that is posted on our website and our customers' websites to provide us additional feedback.

Speakers from EPRI, The Electric Power Research Institute, will provide background on the topics of discussion. The slides will be available on [nppd.com](http://nppd.com). Live polling will be conducted this evening throughout to gather collective feedback. NPPD president and CEO, Tom Kent, will speak on a discussion draft of the carbon emission goal. There will be plenty of time throughout for your feedback and questions. We are recording this meeting to capture all your questions and comments for future analysis. Brad Kitchens will be tonight's moderator. Brad is the CEO of ScottMadden and he has over 30 years' experience as an energy management consultant.

We do have some ground rules as we begin the evening. One, to provide comments, we ask that you come up to the microphone here or back there, provide your name, what city and state you reside in, who your electrical power provider is and any affiliations you may have. Comments should be concise. Our moderator may limit, if necessary, to ensure all attendees have a chance to participate. Please stay on topic, this is not a debate about climate science nor is it a platform to talk about NPPD costs or outages or any other issues you have with NPPD. It's focused on the objectives we have here stated tonight. Comments should be simple, please respect opinions and refrain from debating one another. We're here to collect everyone's opinions.

So, Tom Kent, our CEO and president, you'll be hearing from him a little later in the program when we talk about the strategic directive or the discussion draft of that. At this point, I have shared that we have nine board members. I'm going to introduce them, they can either raise their hand or stand. We have Jerry Chlopek, Mary Harding, Bill Johnson, Gary Thompson, Aaron Troester, Wayne Williams, Ed Schrock-

Ed Schrock: Hold your Schrock.

Timothy Arlt: ... Bill Hoyt. Also, in the audience today, I did recognize Senator Gregor. And then at this time I'd like to invite Bill Johnson, the district director from this area to give a welcome from the board's perspective.

Bill Johnson: I got to follow the rules, right, Tim? I'm Bill Johnson, I'm a resident of south of Pilger and my provider is Stanton Power District. Now, we got that out of the way. Again, I'm Bill Johnson, I'm the director from subdistrict 10, which includes all of Madison County, all the Stanton County and parts of Antelope and Pierce County. Now, I'm going to stay to the script here because my fellow board members and a couple of staffs said that I was the guinea pig and the first one out.

So, we're dedicated to serving your family, friends, neighbors, by listening and gaining an accurate understanding of your needs and expectations to ensure they are top of the mind with any decision we make. This process works best when we can facilitate productive opportunities for you to communicate, which allows us to listen. Your feedback is extremely important to us, and we welcome your candor and honesty. The board looks forward to tonight's conversation, so welcome to you and thank you for coming. And I was going to make mention, we probably would have had all 11 board members here. One board member is not feeling that well and the other had a death in the family or we'd have had everybody here because we all want to hear what you have to say. Thank you.

Timothy Arlt: Thank you, Bill. And at the risk of being fired tomorrow, I forgot to announce one of our directors, Charlie Kennedy.

Charlie Kennedy: [inaudible 00:13:35].

Timothy Arlt: And it's also my understanding that the mayor of Norfolk has joined us, Josh Moenning. With that, Brad, I'll turn it over to you to begin.

Brad Kitchens: Yes, sir. Tim, thank you. Well, good evening. And let me be the second, third in line to welcome everybody to this really, really important forum. And I'll tell you, I don't know about my colleagues up here, but I am surprised and thrilled with the turnout. We really are eager to hear what you have to say about this process that NPPD is embarking on. I think Tim did a wonderful job of just establishing a backdrop. Let me remind you that you have two bites at the apple, and he mentioned this. One is to provide us feedback today and the other one is to go to the NPPD website. There's a terrific survey up there that walks through most of the same issues we're going to be talking about today. And it also provides a lot of information around some of those questions that we're going to talk about today and within that survey. I took it last week. It takes about five or 10 minutes, so it was not lengthy. I think you'll find it instructional, and it will certainly be very helpful to the NPPD leadership team and board as they embark on this.

It's a strategic planning exercise. He mentioned IRP, Integrated Resource Plan. It's really about looking for the next 20 years, what's our generation portfolio need to look like? I will share with you, I consult throughout the country with many, many different utilities. The same questions you're asking, your NPPD team and board are asking, every utility is wrestling with these same issues. Now, not every utility goes

through a public forum process like NPPD. And I think we should all be excited that it is open transparent and again, we really do want to hear from you. So, with that said, let me share with you what the lineup is.

We've got three hours slotted; we may not need all that. We cannot go past 9:00, but generally we're going to hear first from two experts on what's taking place in the industry and what are utilities wrestling with to hopefully just provide some grounding for everybody on this very important topic. As Tim said, we hope that you'll kind of refrain from questions until we hear from both of those. That'll be about an hour in total and then I'll moderate a Q and A session where we will allow all of you to either provide feedback, what you like and what you don't like or ask us or ask the experts questions. Then we'll take a short break, we'll come back, we'll hear from Tom Kent, the CEO, and he'll share some initial thinking from the board and leadership team on the direction of NPPD as it relates to the generation portfolio and carbon or decarbonization.

And then once again, we'll have 30 to 45 minutes to engage in Q and A or frankly, more importantly, comments. We'd love to again, hear feedback. So that's the rough lineup we have for today. So, we have one difficult test here, which is to say we want to do some polling initially and throughout the session. So, this is our first meeting by the way, we have five as Tim said. So, the moderator is learning this as well, but for the polling that we're going to do throughout, we're going to do a quick test right now. Hopefully, you have smartphones most of you. There's two methods, one method is to just log on to pollev.com. This is the preferred method by the way, the other one's texting, but this one's better in terms of seeing the entire poll.

So, if you just go into pollev.com, it'll ask you for a username. You just put in NPPD999, the next screen will come up and it asks you to put your name, just hit skip. If you hit skip, it goes straight to the survey question which we're going to put up in a minute. If you prefer to text, it's your other option, you can just go to text, you can see it on the right-hand side. Instead of putting in somebody's phone number, you're going to put in 22333. And then where you would type your text message, you're going to put in NPPD999. And then once again, it will take you to the site and allow you to respond to these questions. Yes, Tom?

Tom Kent: So, this is the alpha event, right?

Brad Kitchens: It is our first one.

Tom Kent: And so, for anyone here that happens to be NPPD staff, and I know who you are, and the board and I know who you are, I deeply care about your opinions, but not tonight. So don't participate in the surveys, thank you.

Brad Kitchens: Well said.

Speaker 1: Can you please give us directions there, at the bottom of the handout?

Brad Kitchens: So, is everybody on? Let me ask you a real quick question for my benefit, and then we'll go to the polling question. Just by a show of hands and as Tom said, not board members and not NPPD staff. If you have one or two choices, one choice is I'm pretty familiar with how the power system generation, distribution works, I understand the pros and cons of trade-offs, the challenges or this is all

pretty new to me. I'm curious, I'm interested, but I really don't know how it works and I'm eager to learn more tonight. For that first category, you have a pretty sophisticated understanding of the industry. Just raise your hand, please, just so I... So, several, I don't know who's NPPD and who isn't.

So, for those that would say I'm pretty much a novice, but I'm eager to learn more and curious how all this plays out, could you raise your hand? So, I'm going to say roughly an equal number. For all of your benefit, the two presentations are primarily for the latter category. So, it's going to be, if you understand the industry well, if you're a wholesale partner and you deal with this every day, bear with us. We want to get everybody's basic grounding of what the issues are. And then again, we're eager to hear from everybody. So, I just wanted to set that stage. So, let's go to the first question, do I control that?

So, this is the first question. So, if you've got the text, all you can do is enter A, B or C. If you're at the website, you can actually select one of these. But on the topics that you're expecting to hear tonight, what is the most interest to you? Are you interested about hearing the risks associated with being a carbon emitting utility and you want to understand those better? B, you want to understand what the current plans are around NPPD's carbon reduction goal and what it should be or three, you're interested in learning more about the trade-offs, the principles of costs, reliability and environmental impacts.

I know they're all important, but if you had to pick one that you're particularly interested in. If you could just weigh in with your vote, just one, so we can practice this and get an initial view of what's on your minds. You can see the results in the lower right's, we've got 30 that have already weighed in, but I'm guessing there's probably another 30 that we could get some results from here in just a moment. We'll give you 60 seconds or so. If anybody's having particular difficulty and you want to poll, raise your hand and we can find you some help.

We've got 40 up. We're stuck at 40, so we may be... Is anybody still trying to get in and having difficulty? Again, we have several polls throughout the course of the evening that we hope will prompt some thinking, prompt some questions and frankly, provide us some good information on what's on your mind. We have 44, way to go and look at the results. So, about half of all those that voted are particularly interested in... I keep using the word trade-offs, that's the issue. What are the trade-offs between costs and environmental impacts and reliability? We'll talk a lot about generation sources and technologies. And I can tell you now, one technology does not deliver all that. You've got to have be thinking about a range of technologies, a diversified portfolio of technologies, you'll hear from our experts on that.

But that trade-off question that most of you placed your votes, that's the question on the table. That's the question every utility across the country is wrestling with. That's the question that Tom and his team are also wrestling with, and we want to hear your feedback today. So, with that, I'm going to keep us rolling. So again, we're going to hear from two speakers. The first speaker is Dr. Tom Reddick and he's going to talk to us about the priorities of an electric services system. And again, begin to set the stage for you have to balance and manage costs, reliability, and environmental impacts. And then we'll hear from Bill who will talk to us more about just the impacts of managing carbon and thinking about carbon differently. Like it or don't like it, it's on the table. That's what everybody's trying to deal with, so he'll talk to us about again, the trade-offs and considerations as you think about that topic under the banner of cost, reliability and environmental impacts.

So those would be the two topics. Let me introduce Tom, we'll do a little polling, then I'll introduce Bill, we'll do a little polling and then we'll open it to Q and A. So, Tom, our first speaker is Dr. Tom Reddick Key. He comes to us from Eastern Tennessee, he is the technical executive at EPRI. So as Tim said, EPRI is the Electric Power Research Institute. With any utility in the United States, if you're looking for expertise, technical expertise and research and development or virtually any topic, you go to EPRI. They serve over 90% of the revenue in this industry, they were founded in 1972. They provide support to the 38 or 40 countries throughout the world. They are the experts on topics like we're going to be talking about today. Dr. Reddick in addition to being the technical executive at EPRI, he focuses largely on energy efficiency, demand response, electric transportation, EV activity and electrification.

We won't touch on all those this evening, but that's just a range of expertise. He also has led for the past seven years a DOE, Department of Energy, initiative around identifying the next generation of electric power engineers. Before EPRI, he spent some 35 years in the development and deployment of new methodologies and technologies to solve modern utility challenges. He was also a professor at University of Tennessee. I'm going to go out on a limb and say, he sounds like he's pretty qualified. So, with that, Tom, I'll let you take the floor and it's all yours. We have about 30 minutes, sir. So, thank you.

Tom Reddoch: Sounds good. First of all, can you hear me? Oh, that's great. It's a particular joy for me to be here tonight to share with you a little bit of the background of who the Electric Power Research Institute is. [inaudible 00:24:48] or both been with the institute now for several years. And in the course of that, this is our symbol that we use most often to describe which is the very principles that are being laid out. It's the very principles that [inaudible 00:25:10] tonight. I can do anything with just [inaudible 00:25:18]. Tonight, it's this special foursome and we're going to look at how these things trade from one to the other. What does the institute do primarily? We try to accelerate technology to actually help us complete this goal. Well, it moves forward, there we go.

Brad Kitchens: We need to swap mics.

Tom Reddoch: Oh, we got a mic on, okay. Oh boy, it is loud, isn't it? Do you control this one coming on or do I?

Brad Kitchens: Yup, no, you're good.

Tom Reddoch: Okay. I tend to have a booming voice, so if it's out of hand, just please let us know. So, the institute really operates on three principles. We are independent that if I have a single message and foremost, we are not advocates, we're about providing facts so that people that are trying to make decisions begin at the right place, if you wish. We are non-profit and we are present for serving public interests. And the things that we do are collaborative, we really do indeed assemble many voices just like tonight in order to understand how we can create a forward plan that serves many and not just one.

So here are some of the very specific themes that we have been developing at the institute for many years. By the way, EPRI was launched in 1972 and it was born out of the blackout in the Northeast in 1968, with the notion that there needed to be an independent body that would look at what kind of advances do we need in our technology to make our electric supply, in those days, primarily reliable. And as we go through, again, our discussions, we'll build more on that.

The biggest change that we see coming is that, I guess, it's the fourth item in this notion of flexibility. Historically, our systems have been built, what I'll call in a very rigid way. We build supply and we build delivery to chase whatever electricity demand that's out there, that is not the least cost way of meeting the goal. It's kind of like you can build a bridge and put enough steel in it. You can make it strong, but if you're willing to allow that to flex a little bit, it's amazing how you can meet your objective in a less cost way. And more than anything else of recent, we have become increasingly concerned about the impact of carbon and how our choices in terms of building the electric system is actually done in the least carbon impact way.

Here's a concept that I want to share with you as we began to think about how do we build a modern electric system that will be flexible, that will be clean, that will be reliable. And in event that we do lose power under some extenuating circumstances, how do we quickly return service? And inevitably, that day will come and having the right systems in place will allow for a quick recovery. Modern electric systems are built with really two things to keep in mind. One is the electrical power supplying apparatus and two, the role of communications. Sometimes, we use the word communications here as a code word. In today's language, it's how digital technology just flows in.

And in fact, the modern electric system is this combination. It is an integration of power supplying and delivery equipment along with modern computer technology, to be able to make measurements and make decisions and change the path of where we're going. One of the things that's really important is that why do we build a system? It's really for you, that's why we build a system. And if you look at this diagram, what is in the middle of this diagram? It's the consumer. So, the entire notion of putting the electric process together is to ensure that the consumer can have electricity as needed. What's the other big change? We have all kinds of new power producing-

PART 1 OF 6 ENDS [00:31:04]

Tom Reddoch: Tons of new power producing assets coming to the table. And what we're trying to do is learn how to mix those assets and with the ones that we already had. In fact, there's a really interesting number that I find rather intriguing. If you look at the vintage of all the pieces that make up the electric system, it probably spans 75 to 80 years. So, you've got the newest and hottest computer technology, and you may have a very classic device. Could be a boater, it could be a transformer, it could be wire. It's been around for 75 years. And you have to make all of these make marry together. That's what we're trying to achieve in this modern world.

Sometimes it advances and sometimes it does not. There we go. So let me give you just a couple of key history items, because there's a lot of things that are changing, but if you are a student of history, one of the first things that you will perhaps recall is that history has a way of repeating itself. So, things that come in, go out, and then it's amazing how they find their way back. These next two slides actually are a couple of very, very interesting items. If you know anything about the electricity business, you've probably heard of Thomas Edison. And the reason was, he was the first serious electric player when he invented the light bulb. But he wasn't the guy that made it through the winner's circle. This is the interesting part of this story. When he invented his light bulb, it was DC. You know, that's the kind of juice you get out of a battery, straight line.

And one of the problems with the Edison approach, with producing his power or running his power, his DC, was that you can't ship it very far. The losses will just eat you up. So, he's very limited. The best he could do was local. He could not get shared resources to play. And this guy, Tesla, came along. We know all about Tesla now because we hear it with the electric vehicles. So probably the most common electric vehicle out there today is the Tesla. His contribution was alternating current. You may hear the word 60 Hertz. That means that in 60 and it'll go through a cycle of 60 times in a second. And why did Tesla win out? He solved the problem of shipping power long distance, and he did it with one device. It's the device that you hear about called the transformer.

And what you're able to do with a transformer is that you were able to boost the voltage. What does that mean? It's like raising the pressure in a water system, and lower the current, and therefore you could ship power long distances without significant losses. So, Edison won the war. He got there with the bulb. They won the battle, but Tesla got there and won the war because he had a way of moving it. Those were two really key inventions. And here are a couple of other things that are really relevant. And that is that when I look at this chart, the federal government got very active early in the electric power business. And when power is shipped between interstate, there are specific government regulations. The rural electrification act, very, very important part of the process because that brought electricity to people who, historically, did not actually have it.

And then this all began to emerge really in the twenties. And it moved up very rapidly and these key acts were in the thirties. And then by the time we got to the seventies, our power grid nationally was building very, very rapidly. And you note here, NPPD was born in 1970. There's one other really important line here I want to point out. And that's the line just below NPPD. That's PURPA passed in 1978. That's the Public Utilities Regulatory Policy Act. It's amazing that I can get all those words out of my mouth. I used to cheat and write that out on my hand so that I could actually remember it. That's the one that says, if you own a power producing device, you're essentially guaranteed a market for that power. That's a big deal, because if you put a generator at your place, you can connect it and it has a place to go. That had been around since 1978. Now it's beginning to have significant impacts.

So, let's talk a little bit about the electricity process and there are two or three important things. And when I speak with a group like this, I like to start at item six on this chart. Notice how they're numbered. I would like to start with number six. And you know why? You're number six. Everything we do leading up to that is to serve you. So, what we're attempting to do in this industry is to create a process whereby you can have... I mean, maybe I should ask you to say that. It has to be affordable; it needs to be clean, it needs to be reliable, and it needs to be resilient. That's what it's all about, building a system that ensures you will have electricity.

And we have two big things that make that up. You got to produce electricity and they got to ship it. So, when you look at the diagram, one, you're making it. Two, you're using Tesla's principle of being able to boost it up. And number three, I'm going to put it on the big hall part of the system, they call that the transmission system, and that allows us to ship it long distances. But once it gets back to the point where you want to use it, we got to reverse the process. So, when you get to four, you step it down. And then you move out of the transmission system, and then you finally go to local distribution. It kind of sounds like interstate traffic with trucks and things. What are you doing? You got the big stuff moving, and you still have to serve local distribution.

That's how electric system works. Here are some examples of the way you produce electricity. Two important things to think about when you're making electricity, you take your fuel, whatever that is. In some cases, you use the fuel directly with a device to produce electricity. But a lot of the fuel is used to create steam and steam, in turn, then drives a steam turbine that will actually turn an electric generator and produce electricity.

So, if I look at this diagram... By the way, one of the things that I really ask to be added to this slide, these are names in your communities. You can look at each of these different samples and underneath, there's a name from your community. It's important to know that because also many of those situations are what produce jobs in your state. That's a really important piece of the equation. But if you look at wind and solar, they use the fuel directly to produce electricity. Wind, what are we talking about? Wind turbine, windmill, little ones anyway. Solar, we normally think about solar cells that convert sun into electricity. But if we look at natural gas, coal, nuclear, most of those produce by making steam first. Natural gas might be used directly as a combustible. And then hydro, again, direct use.

So that's the other thing to keep in mind. Sometimes you go through an intermediate stage. Sometimes you do it directly. Just a little bit about the transmission, the transmission systems, as we say sometimes, those are the big wires. Those are typically the tall towers. I noticed driving from Omaha up here to Norfolk today is that I didn't see any towers. I saw a lot of tall vertical poles though. So, as you go to place to place, the structure might look a little different. Also, I guess I just didn't pass any substations, but that's a place where you're either stepping it up or pulling it down to get to distribution.

This is what you see most commonly in your neighborhoods. You're going to see some form of distributor. Much of the distribution is above the ground. There are a lot of communities put distribution below the ground. They make a choice. That's what we're wanting you to think about, is making a choice. You can put it underground, but when you do, it's a lot more expensive. It's more expensive to maintain and the systems you need to make it work correctly. So, it's part of the trade-off of this business. If you want it to look prettier, you can stick it under the ground, you just have to be willing to pay for it.

This diagram is really to kind of show you two things. Notice what's in the middle. It's the big pipes. It's the transmission system. On the left, these are all of these major power producing facilities that create their power and then transport it down to the point on the right where you go to distribution. And what you see over there is you could be locally owned generation. It's where we as consumers actually put electricity to work. And what we're learning how to do... Remember that integrated energy network? We're learning how to co-mingle all of these things that need to share to behave. Here's another important thing. Some of you may or may not realize it, but NPPD, and I should say you, you're not in this alone. You actually belong to a larger entity. And this is something that is called the Southwest power pool.

One of the things is this electric industry has grown. In the early days, everybody was off on their own. And the reason we started pooling into arrangements like this was for two large reasons. You can share, and through sharing, what you can do is make it more reliable and less expensive. So NPPD has the connections to be able, under normal well operating situations, but I think about the power of the pool is when you need help. You're not alone. That's comfort. It's the best insurance that you could get. So, as we begin to close out our thoughts here, we're really going to wear you out with this. So here are our four messages. Sometimes I have a hard time remembering these. So, I have my own little sideway of

remembering. I talk about the two R's and the two E's. Now, if you look at this up here, the two R's, you can probably figure out. You're probably wondering where in the heck is he getting these two E's from. But to me, is a little easier to remember. The first E, we're trying to keep the costs low. That's affordability.

The second E is how do we get the electricity that we need with minimal disruption to the environment? So, the second E is environment. When we say something is reliable, what does that mean to you? It's dependable. You can count on it. That's what this industry's tried to do. So, what does the word resilient mean? It means how do I recover when I have a problem? How do I get electricity back quickly? If it's keeping your home warm, you really want it back quickly. If it's keeping your business running, you want to keep those jobs flowing. There's a lot of reasons to follow this particular principle. That first comment up on the upper right is really worth just a sidebar. When you go to the switch, you flip it, and what do you expect? It's going to be there.

And yet, everybody's running around flipping them on and flipping them off. It's a just-in-time business is really what it is. And having the assets to ensure that it's always there, that is a really key part. So here are our core principles. They all have to be shared. You can have more of one than the other, but you may have to pay for it. You can have it clean, but you may have to pay for it. And guess what? As you work your way around, they all get shared. So, what is the one thing that over time, it will help us achieve this in a better way? It's the advancing of technology. So, what did I say in the beginning? What does EPRI try to do? It tries to accelerate getting new technology in place. We wouldn't even be having a conversation about solar if this was 10 years ago. And the reason was, the technology wasn't ready. Today, at least now, gets into our conversation. So, this is the trade-off.

And I think this is my last slide as I recall. There is an interesting practice in the electric business, and it's all about, what I like to use, in my words is, I call it the regulatory pack. Many people call it the regulatory pack. And the regulatory pack essentially puts the honor on electric utility to actually supply all customers. And in exchange for that supplying, that utility will be able to recover its costs. And why was the regulatory pack put in place? Any business will set their prices based upon what they think their risks are. In order to avoid all these excursions in the price of electricity, through the regulatory pack and through the regulatory process, what we've essentially done is offered a lower guaranteed rate of return so that prices are not all over the place. If you want to know how that really works, think about gasoline prices. Gasoline prices are all over the place, and you have to live with that. Under this system, you get stability and price in exchange for making the business solid. And with that, Brad?

Brad Kitchens: Perfect. Tom, thank you. So that was the system. That's how it works. Now we're going to transition in a second and talk more specifically about the challenges ahead of us with respect to carbon and decarbonization, but we are going to do two quick polling questions. So, the first one is this. Tom uses four, I reduce it to three, which is... If you had to pick one of these as most important to you, they're all important, I get it, but if you had to pick one that by golly, I hope we really focus on that one first? Is it cost and affordability? Is it the focus on environmental impacts? Or is it the combination of a reliable electric system or a resilient one that bounces back very, very quickly? If you had to pick one, which one would you pick? So please, either the text or the website. What was the ranking? I'm sorry. My bad. So, we actually have the opportunity to rank them one, two, and three. If you're on the website, you can actually just drag those three columns and rank them 1, 2, 3, correct?

Speaker 2: You press on the actual button itself, and then you're able to move up or down. And it can only be done on the website.

Brad Kitchens: So, on the website, on the left, if you just touch on any of those things, you'll see an arrow on the left-hand side, up and down. If you want it to be first, just hit the arrow a couple of times, it'll go up, and move the other ones down. And that's the way you can advance it.

What's that? So, we have 33 so far. 36. So, we have just about as many as we had before. Give it 30 more seconds, and then we'll... We appreciate, this is kind of the input of the day. And again, we have a lot to talk about this, but we'd like to get your initial thoughts on these three very important items. There's 45. Why don't we go ahead and look at the results.

Very interesting. I'm not going to lie, that surprises me a little bit. So, reliability and resiliency. When Tom said go around and flip the switch, you want it to work, that's the vast majority of you... These bars are generally correct in terms of length. I don't know if they are. It looks like that's roughly twice as much as the other two or it may just be the size of the bar. Affordability and cost is number two. And environmental impact's number three. This next topic, we're going to try to understand these a little bit better. And then we expect that your Q&A and discussion will very much focus on these three items. So, we'll spend more time on these, very importantly. One more question.

So, this is going to be a... If you're familiar with a word cloud, when you hear about decarbonization, if you had to type in one word that comes to mind, curious, don't like it, like it, thumbs up, whatever. If you had to come up with one word, we're just curious... Before we've had a chance to talk about it, what one word comes to mind when you hear the notion of decarbonization? One word or one very, very short phrase. And we'll generate a little word cloud that will give us a notion of what's on your mind with respect to that word.

As you're doing that, I'll just mention, when you talk about de-carbonization and a lot of the goals that the administration and many states and many people have, the power sector's one. There's lots of other emitters of CO2. The transportation sector is the largest in the country. The power sector is the second largest. Other industries, the third largest. So just understand there's a lot of emitters of CO2 of which we're going to focus on one, the power sector, but I don't want you to think that's the only one out there. 46 responses. Why don't we go ahead and look at the word cloud and just see... Yeah, still coming in. 53 responses. So, the bigger the words, does that mean they got more votes? Is that how that comes up? No?

Expensive. So again, if they put expensive, does that mean they got a lot more votes? Okay, so expensive is one that obviously is on your mind. And then you can see all these other words. The size of the word correlates somewhat to the number of votes. So political, several folks thought that. I won't go through them all, but you can see the important, essential. So, both sides of the equation, but expensive clearly, is the overriding one. So, we'll talk about that. So, with that, let me introduce our next speaker. Again, the next topic is entitled business risks of carbon and decarbonization, once again, focusing on the combination of cost, reliability, and environmental impacts. Our speaker's Bill Howe. Bill is the program manager for power quality research at EPRI. His key responsibilities around strategic planning and does a number of client studies around these topics and related topics.

Before EPRI, he worked in the fortune 500 area on a number of engineering and management positions. And with that, Bill, it's all yours.

Bill: Thank you. All right, the usual. Tests, test. Good, we're good. Thank you very much for the opportunity. I want to build a little bit off Tom Redick's presentation. As you know, my research area is power quality. I like to call it the science of unintended consequences. Whenever you change a system, you obviously are hoping for benefits, but we also have to be prepared for all of the permutations of that change as they occur. And in power quality, we see that. And I'll come back to that theme later. The thing I wanted to build on is that a number of authors and other experts have noted that the electric power system is one of the largest, if not the largest, machine ever created by humankind.

And it's been that for many, many decades. Everywhere you go in the world that claims to be civilized has electric power, and the infrastructure to create and deliver that electric power is the largest infrastructure that exists. It did occur to me that the internet might one day come to rival that. But guess what the internet runs on? It runs on electric power. This is an important point. This large machine consists of many, many different components. Tom touched on many of them. I'm going to be touching on a number of them as well with a special emphasis on the theme of this meeting, carbon emissions, decarbonization, whatever term we want to use for it. Yes, it's complicated. And it's complicated in the context of a very, very complicated system. One that I always want to make when we're talking about this complicated machine is that it works so well and is so well managed by well-run companies like NPPD, that we take it utterly for granted.

The power that's running these lights is being generated this instant by a broad cross section of different assets. It's being transformed to higher voltage, as Tom talked about. It's being transmitted over hundreds of miles. It's being stepped down to appropriate voltage. It's going through meters, it's going through wiring, and we've got voltage at the plug because those plants have all that infrastructures running at this instant. We have no other infrastructure that comes close to that, but we've become so good at managing that system and running that system for so many years that I, and everyone else, I don't think about all of that infrastructure when I flip the switch. I expect my lights to come on. In fact, I'm two steps into the room before I realized, "Oh, wait, the lights didn't come on. There must be a power outage." That's how much we take it for granted.

The second element that I wanted to mention, which I'll come back to as well, is that managing all of that infrastructure and all of that capability and that amazing outcome is just part of what utilities do. At the same time, they're managing all kinds of risks, price volatility for fuels, weather, all kinds of vagaries after September 11th. And the anniversary, 20th anniversary of that is coming up. They had to manage all kinds of concerns about threats, direct threats to the grid. That is also tends to be invisible to us. I was asked by a friend, what would it take for me to have an off-grid house? And I understand, absolutely, the appeal of having an off-grid house. It sounds kind of sexy, but I said, "You don't want an off-grid house." And he said, "Well, why?" I said, "Do you want to live with third world power?"

We have first world power because of all of this infrastructure. The first thing you will have to do... I asked him, "What do you think the first thing you would have to do to have an office great house?" And he goes, "Size panels." I said, "No, you're going to have to walk through your entire house and identify every load you have. You're then going to have to figure out how can I reduce that load to its bare minimum. Then you're going to have to say, of that, how can I eliminate load in order to afford the panels that I'm now

going to put up?" In other words, it's not just an energy or power question, it's a lifestyle question. And that is part of what the utility is managing every day. Thank you for your patience with that buildup. Talking about carbon is in the context of that kind of management challenge and opportunity.

The title of the slide, if I could change one thing, I would add risk and opportunity. Because every time there's a risk or threat, there's also opportunity to be ahead of it and to perhaps even benefit from it. So, I'll come back to that as well. So, thanks for the patience. I'll be talking about the machine. I'll be talking about increased complexity, and I'll be talking about risk and opportunity related to carbon. And I just wanted to set that up as a preamble. So, there are a number of different areas when we're talking about energy system transformation. We are in a state, and I'll come back to this theme as well, of unprecedented change for this very, very complex, magnificent machine that we've built. And I'll touch on a number of different aspects. We're seeing changes in supply. That's a big part of what we're going to be talking about today.

New technologies that have been on the horizon, it seems like forever, are now suddenly affordable. We also have economic and environmental concerns that are sometimes drivers for implementing those. Even more importantly, we have companies that are for-profit, that are building generation resources because it now makes economic sense to do so. As a society, we're becoming better and better and better at finding ways to make energy. But I'm going to come back to that point. We only have one good way to deliver power to a broad cross section of end uses, and that's the utility. And that's part of what the utility is working to manage. More and more integrated systems is a second thing. The electric power grid was largely designed and built in the twenties and thirties. I stand back from that and I just say, "Wow, what technologies do we use today that are a hundred years old and are still cranking at that level?"

It's amazing. Tom alluded to... We've got transformers that are 80 years old. Well, why replace them? Perfectly good. If I had a computer that was 80 years old, I can't buy parts for it. We throw them out after eight years, much less 80. And yeah, I don't want to get started on that theme because we use up all my time. But the key is that we are integrating new technologies into our grid. There's a lot of drivers for that, a lot of economic imperatives, and a lot of it is been driven by new technology that's coming available. And we'd be fools not to avail ourselves of it. But the main point is that our grids are becoming more complex. The grid of today and yesterday had centralized generation. I don't want to go through all the litany, but basically, linear one directional power flow from centralized well-controlled, well-managed generation down to well understood and end use loads.

It wasn't reconfigurable. It was very poorly monitored. It had very, very little flexibility. And we relied, essentially, on overbuilding capacity in order to, under the supply contingencies that we couldn't quite predict. Wow, has technology changed that profile? And I'll talk a little bit more about that later in the presentation. We are here because of community. We're here because NPPD wants to solicit your input. Restating the obvious, the only reason for the utility is to deliver power to all of you. So having your input and participation in that process is essential. I will point out, being on the power quality side where we're talking about the interface of electric power to end use in many cases, I've seen a huge uptick in interest in, how can we increase the value of our product to the customer? Not just we're providing it, there's voltage at the plug, we're keeping prices down, how can we increase the value with our expertise and our relationship with the community?

That's, I think, evident here today and certainly a broad trend in the industry. And the last point, I'm not going to spend too much time on here. It's really an economic question about what we're doing about

carbon. There's a lot of drivers, there's a lot of opinions, but really it's an economic opportunity and challenge that the utility must manage to keep doing a good job for you. Energy supply, we've talked a lot about that. Actually, this slide is too simple, in my opinion. I do want to make a point. We're making better, more and more ways to create power. We have a huge uptick in solar. I'll give you numbers on that later in the presentation. Huge uptick in wind generation, use of a broad...

PART 2 OF 6 ENDS [01:02:04]

Bill: ... generation, use of a broad cross-section of more traditional generation resources, fossil resources, nuclear, hydro, all of that is very, very important. It used to be that we needed the utility entirely for energy. The only people who were creating their own energy were people who had standby generators or things of that sort, or who are off the grid. The main role going forward for the utility is not only to be on the energy side but the only game in town for delivering power. So, managing that big machine to give you a continued service.

There is one comment that I wanted to make. It occurred to me that if you went back some number of years, let's say 50 years ago, all we cared about was the service that electric power supplied. We didn't care much about the plants. We didn't care much about where the transmission lines were located. We didn't care much about the fuel. Maybe we cared about the jobs if a plant was local. What we wanted, purely, was the service of having an electric power. In fact, the major theme going back then was things like rural electrification, underserved areas getting electric power. We hardly hear... Again, that's still an issue, but we hardly hear about it now because we've done a good job of getting the service to everybody.

Today, much more complicated. We want the service, but we also want a bunch of other things to go with it and that's the societal element that it's incumbent now on the utility to manage.

Let's get to some numbers. I don't think there'll be anything here that surprises too many people. Utilities for the most part in the United States used huge amounts of coal. Why? It made economic sense. It was secure, produced locally. You could stockpile it. We understood coal fire power plants very, very well. They were low costs. They were very reliable.

As I said, going back sometime, I'll just use arbitrarily 50 years ago, we weren't that concerned about the emissions. In fact, we may not have cared about them at all. Since then, a lot of things have changed and the industry has responded. The most conspicuous response is going to what I consider to be an interim fuel, a bridge fuel, which is natural gas. Natural gas per BTU admits half the CO<sub>2</sub>, less than half the CO<sub>2</sub> that coal typically produces. Okay? I'm benefiting on one thing. It's a great resource. It doesn't emit any particulates. There's no heavy metals emitted. It doesn't produce ash. It is easy to transport, relatively easy to stockpile, and we've gotten much, much better as a society in getting it out of the ground with tools like fracking, et cetera. Made a lot of sense. That I think will continue to increase and there's a carbon benefit to that. Direct response to market pressures. The costs of using a particular fuel shifting to fuel because it's offers a better, not just cost performance profile, but an environmental profile as well.

Obviously, there are other things in the mix. Nuclear has been very steady in the US. I actually think it'd be great if we could commission more nuclear power plants, but I'm an engineer. That doesn't seem to be in the cards. Hydro is also hard to add, but where we're seeing conspicuous growth are in the renewable sides, and it's not too surprising because it hasn't really harvest these to the extent that they

were untapped resources. So, we would expect to see a rapid growth. So, wind, solar are rapidly increasing and will become an increasing part of the resource mix and that's happening within NPPD's service territory as well.

On the USRA, this presenting kind of the same data, but it perhaps in more of a pie chart format. Actually, like this a little bit better because it's more or less assertive over 15 years. 15 years ago, roughly, we had 50% of our power generated with coal and negligible power generated with wind and solar. Today, coal is less than half of what it was. Huge increase in natural gas for the reasons I've already described but 10% of our generation capacity in 15 years went from zero to 10. Now it's 10 enough? I'm not going to try... 10's a big number in the context of this change and what immediately sprung to mind for me looking at this is the classic hockey stick curve. You get incremental, slow, slow, slow, slow growth, and then explosive growth. That is what I think we're, we're poised for and seen in the US market.

Coming closer to home with NPPD, over the same roughly time interval shifted by a year. In 2005, 65% of NPPD's generation was fueled by coal. Again, very, very common in the industry and for a lot of reasons. By the way, I want to mention, it's easy to talk about power plants. Let's say, well, that one's coal and that one's natural gas and these are others. We're talking really long cycles in terms of planning, executing, fuel supply contracts, deciding where you're going to locate plants, what type of configuration they're going to be, actually building them, getting them into the rate base, et cetera.

This is what I call a slow twitch process of moving generation capacity from one fuel source to another. That said, the results I think for NPPD are quite remarkable given over a 15-year timeframe, going from 65% coal to 42% coal. I'm not commenting on the merits of that, but that level of shift, that doesn't happen by accident. That's a volition. That's taking into account all of the contingencies that we've talked about of keeping this machine running and making the decision, we are better served and we are better serving the community by moving to a different kind of resource mix. And if you look at it, it looks to my eye, quite a bit more balanced in terms of the overall resources.

A lot of wind being added and the other thing that that grew quite a bit is as liaison. We talked a little bit about the community that NPPD is a part of. Purchasing power when it's appropriate from your neighbors, sometimes it's the smartest economic move.

I'm not sure I hit the go button, but there it is.

So, I mentioned earlier about increased grid complexity. One of the things that's driving us is more in what we call, integrated grid. As I said before, we had largely a linear grid from generation down to end use, and it was largely static. If there was a fault somewhere, you knew exactly where it happened. Now we're talking about integrating all kinds of new technologies, whether they're generation resources. A lot of this is data-driven by better monitoring. Being able to understand what's happening in different parts of the grid so you can now optimally route power in different ways. That also has very, very important potential reliability benefits because I might be able to energize part of the grid that otherwise would have been de-energized by an open breaker or something of that sort, by rerouting power in clever ways.

This is part of our world today. The challenge to utilities of going from the equipment that we've had installed since the 1930s and has worked well for us for 80 or 90 years. This new model is very complicated and takes a lot of effort to figure out and being a research organization at [Brin 01:09:49], we like to think

we're here to help, but we recognize, especially my area, whenever you make changes, you're taking on risk. The key is to take on risk that produces benefits. The risk is measured, and the benefits outweigh that risk.

But what you get with a flexible grid is more flexibility. The ability to respond to different market signals, be able to... We talking over earlier about NPPD's very impressive ability to work with irrigation networks and systems to reduce load to do demand response by being able to shut off some number of megawatts, I think up to 500 when needed.

Well, that may be an inconvenience for the irrigation folks, and I'm sure that it is. I'm sure we have irrigators, people who use irrigation in this room, but the benefit to the flexibility of being able to operate the grid to be able to not have to build a new power plant or necessarily up sized transmission and distribution circuits, to be able to work in concert between the generation side and the power delivery and the end use side, that's an innovation that has really come about in recent years, and to hear about NPPD success in implementing that it was quite inspiring and I think maybe a model for other utilities to follow.

Part of the challenges also in modernizing the grid is all of the devices that we are now integrating in our homes. Rooftop PV, local energy storage, local generation, in some cases standby generation, but also just the electronics that we're adding. Virtually, 100% of the future load is going to be electronic load. It's going to be inverter connected load. This load is very, very sensitive, even more sensitive than the historic loads to power quality and any changes, any perturbations in the system. Ironically, as we are making the system more complex, as we're hoping for improved performance on many metrics like carbon, as we're hoping for lower prices, at the same time, we're basically demanding collectively higher performance from the utility as well.

So, PV system operators, they go into a field, they build a bunch of solar arrays, and then they plopped in an inverter and they connect to the grid, and they say, here we are, take our energy. They are not delivering power to your homes. The utility is taking that energy, making sure it's perfect frequency, as close as we can get, perfect amplitude, that it's 120 volts at your plug and perfect phase relationship cross polyphase systems.

Sorry, a little wonky there, but all of these parameters are being managed by the utility. So, they're taking in all of these different disparate sources, making sure that they're right for your end use loads and then delivering them. That takes a lot of planning and a lot of its integration as we know very well.

So, we talked about community and environment. Why is carbon important? The simplest answer is because it's become important. Governments around the world care about carbon emissions. Scientists and other organizations, and it is become important and that economic challenge and opportunity for any carbon producing industry. It's something that we now have to manage and so I think that's part and the driver for, for this forum.

A number of ways that de-carbonization is being considered. It probably started with energy efficiency. The reduce, reuse, recycle kind of ethos and what has happened, particularly with Fortune 500 companies, which I've worked for some and have been associated with a number of others, is efficiency was originally viewed as an inconvenience. Oh yeah. I guess we're supposed to use energy efficient motors, or I guess

we're supposed to use energy efficient lighting. Very, very quickly morphed into an opportunity. How much can we reduce our costs? How much... It became sustainability. How much can we improve or reduce the risk of our being a cited for an environmental violation?

I worked in petrochemical for a number of years and the cost of clean-up, the cost of fines, et cetera, more than motivated all of the environmental measures that we ultimately put in place after a little bit of grumbling. Cleaner electricity, we've talked a lot about that already with the solar and wind. If we can produce electricity more cleanly, then we're benefiting all of society and in fact that deals directly with the second or the third arrow. There is an ethos out there that if we can electrify more things, maybe we can make the overall economy more efficient. Well, that's predicated upon having clean electricity and lowering the carbon and other environmental footprint for producing electricity.

So that leads us to low carbon ethos and de-carbonization. I always trip over the word de-carbonization because I think it could be interpreted a lot of different ways, but the key, what it rolls up to is economic efficiency and operational efficiency, which avoids risk and leads to opportunities. Speaking of which, Tesla was already mentioned earlier, the automobile manufacturer, they recently entered profitability for the first time. Who knows what drove them into profitability?

Two things. God, I just forgot the second one. I'll remember in a moment. They are making \$500 million a quarter on selling carbon credits. \$2 billion a year. The other's Bitcoin. Sorry. That's why I forgot it. I just tried to drive that from my mind. So, the other was Bitcoin, which is totally random in my opinion. Yeah, carbon credits.

So, Tesla produces electric vehicles, zero emission, and they're given carbon credits in exchange for that. They are able to take those carbon credits and go to industries that want to balance out the carbon that they're making or perhaps either they want to or they're required to, they sell those and make massive amounts of money. The industry's buying those, that's an expense. The industry selling those, that's a profit. For the best run companies, if you're a carbon producing company and you can reduce your carbon footprint, you may very well be able to sell into an extremely profitable market, those credits.

That actually presages, I think, the slide after this one. So let me cover this slide and then I'll come back to that. Sorry. I'm getting sided.

Speaker 3: Five minutes.

Bill: Okay, great. So, there's a number of different ways to think about de-carbonization. Going to renewables is obviously one. To have renewable energy resources that take power directly in from the sun and give you electric power or some other form of energy without producing carbon, that's obviously prominent. Also, another way to think of it is all carbon free resources, which would include hydro and nuclear ways to produce energy that also don't produce carbon. A little bit different from renewables, but certainly a fair part of it. But I think the most universal concept is what we call net zero.

We're having a conversation earlier about getting to zero carbon. We all know the 80, 20 or 90, 10 rule. Getting a good part of the way there will be fairly straightforward. It'll involve some hard decisions and some important trade-offs. We probably can get 80 or 90%. It's going to be that last 10 to 20% that's going to be extremely difficult. It's going to require a lot of probably some belt tightening in order to achieve.

Where there's lots of different ways to think about achieving that but the key is that what if we net out at zero. What if I'm still producing a little bit of carbon or the minimum amount of carbon that I can, but I can offset that with whatever measure, whether it's credits, planting trees, helping other parts of the world improve their carbon footprint, there're all kinds of different scenarios that are in play.

There's lots of initiatives around the world. Why are we here? It's because the world is increasingly concerned about carbon. It's a risk profile and as I've said, an opportunity profile that every company has to manage, particularly those that are involved in producing carbon. In the United States, electric power production is roughly tied with transportation and industrial for the amount of carbon that's produced, about 25% for each of those. Obviously, anyone who cares about carbon is going to be looking at the utility industry as one opportunity for improvement.

We deal with multinational corporations. Any multinational corporation that wants to locate to Nebraska may very well ask what is your approach to managing carbon as well as other things. So, it's important to be ahead of that.

Here's the market slide. So, carbon credits are an old idea. The idea is that you can trade essentially permission to emit carbon. The idea is that as the price for these goes up, so does the economic incentive to reduce one's use of carbon. So does the economic incentive to be able to sell these kinds of credits into the market. And as you can see in the European market, the cyan line at the top, it went from 10 bucks when they started and it's over 20. Probably 25 now. So generally, an increasing trend in pricing for carbon credits. This is one model for maybe how to provide incentives for reducing carbon.

I've already mentioned most Fortune 500 companies now have some kind of environmental statement and some kind of environmental goals up to and including we will be carbon free or carbon neutral in sometime. We want to be part, or we need to be part of the value chain that brings that. At least, I think that will provide economic benefit to the utility as well as to the communities that the utility serves.

I think this is my next to last slide. So, we talked about already NPPD's energy production profile in terms of the fuels and energy sources that are used. The key thing we're here to talk about is the future. Based on feedback from you, what kinds of priorities should NPPD have? How should they continue to manage this incredible machine, but in ways that honor and acknowledge the risks and opportunities of the future, the changing technologies that we're dealing with, and to continue to provide the excellent level of service?

The poll that we did just a little bit ago, I thought it was spot on. What everyone cares about first and foremost is when I flip that switch, do I get my lights? That's what we all care about. We care about other things too, but that's the thing we most care about and that's actually a non-trivial question. As we integrate renewables, they're more variable and less predictable than our fossil fire plants. It's much harder to manage cloud cover, snow cover, wind. Those are the vagaries of nature, but that's exactly the kind of risk profile that utilities are good at managing and why we need the utility to help us manage it.

So, I think my last slide is a repeat of the four-quadrant slide. It's a balance and I guess at the end of the day, we're all in it together, but thankfully we're not alone. Thank you.

Brad Kitchens: Bill, thank you.

Two more polling questions and then we'll open it up and look to hear your questions. Not about NPPD first because we're going to take a break and then come back and hear from Tom but if you have any questions for these guys on these topics, or if you have any comments to us on these topics, we'd love to hear them. We'll take a break. And then again, we'll come back and we'll start talking about NPPD specifically.

But a couple polling. So the first one is based on what you heard, what concerns you, not what do you most interested in, but what concerns you most about de-carbonization? One is the risk of doing nothing is a concern. You have the risk of not knowing how we will get there. Maybe it's the 80, 20, 90, 10 that Bill just talked about, or I'm not really that concerned about De-carb. It'll work itself out. Which of those three, would you place your vote in terms of what concerns you the most?

42 results. I think we saw 53 or four or five earlier.

10 more seconds. There's 50. There's 49. Somebody withdrew their vote. We're back to 50. Let's go ahead and see what we got.

Oh, wow. Pretty even across the board. So, the risk of doing nothing concerns you. The risk of not knowing how we'll get there concerns you and equally, I'm not concerned about de-carbonization at all. I don't know how to respond to that other than it's split one third, one third, one third. And again, I think we'll talk about some of these as we go.

Let's do one more quick question. So, we're going to talk... We appreciate you haven't heard about NPPD yet and what their plans are. Haven't heard from Tom, but just kind of going into that conversation here in a few minutes, in your opinion, has NPPD done enough to diversify their energy resource mix? You saw a little bit about bill showed on what it looks like today versus what it looked like 15 years ago and your initial judgment. You think that movement is too ambitious? You think it's doing more than enough, but not too ambitious? So, it's aggressive that appropriately aggressive. You think it's about the right pace? You think we're not doing enough, but again, not way behind the curve or you're pretty concerned that we're far behind where we should be, or you just don't know. A lot of options there. If you had to pick one of those, where would you land today?

See if we can punch through 50. Close enough. Let's go ahead and see what we got. Very nice.

Kind of two audiences there. I find that interesting. One large segment of the group thinks we're doing more than enough, not too ambitious, but tracking well, maybe a little ahead of the curve. Not as many, but another large segment thinks that we're far behind. So, that's a kind of binary in terms of your response. So hopefully, through the course of the evening... Again, we won't answer all that because we don't know exactly what it looks like, but we hopefully will answer some of your..., or address some of your questions and hear from you.

We have about 20 minutes and I keep saying this, but just so you know the layout, then we're going to take a break and they're going to come back and hear from Tom and then we're going to talk about NPPD's plans or thoughts as they exist right now.

But if you have any questions for the experts or any comments on what you've heard so far, we'd love to hear from you. We've got a mic in the back. We've got a mic in the front. As Tim said, we'd really like to hear your name, your city, your power supplier and your affiliation if there is one. This is being recorded just so we can kind of keep track of the sense of the room but please, any questions, any comments that anybody has thus far on the topics we've talked about?

Yes, sir. But can you go to a mic? Do you mind? Or I guess we can walk one around to you. You can just stay there, sir. We'll get to you in a minute. So, it can be a question or it could be a comment. We'll either field a question or we'd love to just hear what your thoughts are. Please.

### 3.1.0 Public Comments

Speaker 3: I got to get back [inaudible 01:27:06].

Brad Kitchens: Oh.

Speaker 3: All right. Okay.

Brad Kitchens: Not quite yet.

Speaker 3: Try it.

Speaker 4: Can you hear me now? [inaudible 01:27:23].

Speaker 3: Is it on?

Speaker 4: I can just talk really loud.

Speaker 3: [inaudible 01:27:37]. [crosstalk 01:27:56].

Brad Kitchens: Can somebody with a Lavalier just walk back there and... Maybe just walk a Lavalier back there.

Speaker 3: Test one, two. Test. Test. [crosstalk 01:28:08].

Brad Kitchens: How about now? There we go.

Speaker 4: There we go.

Brad Kitchens: Now you forgot your question.

Speaker 4: Oh, that seems pretty loud. I really appreciate the experts talking about the economic impacts because wherever we lie on this issue, if it doesn't work economically, it just doesn't happen. Talking about... I know that we'll be talking more about the future and decisions that are going to be made. We've moved more towards natural gas, moved a little bit away from coal from what you put up there.

Economically speaking, in the long-term, it seems that the goal across at least the developed world is to move to zero emissions, which would not include natural gas and as we're thinking about future power plants that we're building, are we thinking about the long-term? If we build a natural gas plant right now, let's say, that 30 years down the road, 40 years down the road, it's going to be useless to us. When we're thinking about what we're investing in, how far into the future are we thinking?

Brad Kitchens: That's great question. I'm going to ask that we try to be pretty brief with the answer so we can allow a lot of questions, I'd love to answer it, if they don't, but go ahead.

Speaker 5: I guess. One comment I would... Hello? Yeah. Okay. The one comment I would make is if we get 20 or 30 years out of an asset, that's actually pretty good performance. So, I think that the major concern is... I think your question is spot on and a big part of the elephant in the room is what are our event horizons? What are our goals and what does it make sense to build today?

Sorry to harp on this, but we need this machine to keep running. None of us are willing to put up with, "Hey, you won't have power for the next couple of weeks, but that's because we're transitioning." No. No, the answer is no. You keep my power on and make everything else happen. So, I think if we're able to make prudent decisions today that get good asset life and asset utilization....

The other question and the elephant in the room is that part of running this machine is to have backup, to have reserve. So, it's also internally possible that even as we move to a hundred percent renewable, which I think everyone is talking about, you still have to have contingency like we saw in Texas. I don't want to pick on Texas, but wow. Easy to pick on right now, right? In fact, both extremes, hot and cold in close proximity. So, you want to have enough contingency and having a fossil contingency just for me, I don't want to necessarily be speaking for everybody, is a reasonable part.

One other caveat though, is potentially hydrogen. If we do move to readily produced low-cost hydrogen that we can store, maybe we can transition away from the contingency of natural gas to a zero-carbon contingency, like hydrogen. Again, probably at a risk profiles and costs there that I don't understand the nuances, but these are some of the things being considered.

Speaker 3: Okay. Can we get your name please and all that [inaudible 01:31:38] up, location?

Speaker 4: Check. Yeah, my apologies. My name is Paul Muncie. I live here in Norfolk, which would make NPPD my power provider. I'm a history and geography instructor here at the college and if I could just ask a super quick follow-up. Goodness, I think my brain just went blank so maybe I won't ask that follow up. Yeah. It's not Bitcoin. It's not Bitcoin, but it is just in concerns...

I remember what is now. As we are now not... Global change or climate changes isn't coming, it's here and that is something that the utility has to actually worry about in terms of cost. Again, thinking economically, if we don't make the transition fast enough, if we don't push towards these renewables fast enough, is that going to cost us more in the long run, due to more extreme weather events that cost utility a lot of money?

Brad Kitchens: Any thoughts on that? Again, quickly.

Bill: Yeah. Just a short comment. It's important to realize that the US only contributes about 15% of total worldwide carbon contribution. As a result of that changes that we make do not solve the global problem.

PART 3 OF 6 ENDS [01:33:04]

Speaker 6: Changes that we make do not solve the global problem, which is most likely driving climate events, not just what is happening. This is really important, so then why are we trying to make the moves to address the situation? It may be that we show the rest of the world about how you get to the answer.

Speaker 7: You know, leadership matters.

Brad Kitchens: I'll provide a quick, I work in this industry too, a quick answer to your first question. One of the reasons that we have made the wonderful improvements we have for carbon reductions as an industry, 2.5 billion tons in 2007, less than 1.5 billion today. So, about a 40% decrease as an industry. 45% decrease at NPPD is because we've transitioned from coal to gas. Your question's a good one, though. The existing gas will continue to help us meet continued reductions. New gas presents a stranded cost risks that every utility is going to. I want to put in a billion dollars for whatever gas plant that could be stranded investment in 10 or 15 years. So, I think that's a very relevant question. Next sir. Please. Name, location, power supplier.

Dean Smith: Yes. Dean Smith, Brunswick, Nebraska. Antelope County, North Central Public Power out of Creighton. Watching the presentations here, I tried to keep track of the slides and the number of times the presenters mentioned reliable, and I marked down seven, and one time was service, which I would relate to reliable. If everyone kind of remembers back to mid-February, what happened there? There's the discussion, on the one pie chart, if somebody could answer that, it says 6.2% of the production is from wind. Is that nameplate capacity or is that what the wind is actually producing out of the total need?

Brad Kitchens: Right. Yeah, that was energy. So that's the actual output. Capacity would be a lot higher but it was actual output.

Dean Smith: Thank you for that. I went to the NPPD website and pulled off of there, you have a monitoring device on production from all your sources. On the wind side I looked, or it was the one that was showing was back a week or so ago, and out of a potential of 500 megawatts during a given day for 12 hours, the potential of 500 megawatts from wind energy. That's how much NPPD has under agreement to purchase. As I read from your website on your chart here. There was a 12-hour period out of three days that there weren't over 12 megawatts produced. Meaning there wasn't enough wind. Now in the voting that was done here related back to reliability, as the presenters have said, when they turn the light switch on, they want electricity, they want their lights to come on. So, I think it's a real issue already at the percentage that we're at, in Nebraska, with wind production, that NPPD is purchasing, and we had happened the mid-February situation. So, I guess I did, I wanted clarification on the 6.2 and then I guess that's my thoughts on that. Thank you.

Brad Kitchens: Reliability should be one of the very, very top items, and you have some concerns about the direction of the industry and NPPD with respect to continuing to manage effectively that reliability if

you pursue certain asset strategy. I think we'll hear more about that, but understood. Oh, I'm sorry. Yes, please. I'll get back so I'll get feedback.

Doug Nelson: Doug Nelson, Wayne, Nebraska. Northeast Nebraska Public Power. I'm a farmer. I hear carbon tonight is really getting a bad name, but I can't raise a crop without it. In particular carbon dioxide. Every organic compound on the earth contains carbon and we don't create it. We just move around a little bit in the cycle, but we do not create carbon. It's already here. All energy on earth originates from the sun. It comes here in the form of light is transformed into heat, and with heat, light, mineral in the soil, and water, we can raise a crop. Energy cannot be created or destroyed. You know that, and every action there is an equal and opposite reaction. You can't create it. You can't destroy it. You can only change its form, and that's what we're doing here with sunlight.

The percent of CO<sub>2</sub> in the atmosphere, does anybody have a clue what that might be? Just take a second and try to make a guess, okay, it's 78% nitrogen, 21% oxygen, and 1% are argon. So, if you're adding that up in round percentages, that is a hundred percent. CO<sub>2</sub> is less than one half of a percent in our atmosphere. It's a very important ingredient. Back when I was in college in the early seventies, the new ice age was the rage. I'm old enough to remember the new ice age rather than global warming or climate change. It was about emissions and CO<sub>2</sub> and things like that. Well, that didn't happen, but it was based on the fact that the last ice age, during the last ice age, carbon emissions were 10 times higher than they are today. But to be fair, during the medieval warm period, the carbon emissions were 10 times higher also.

The point is that CO<sub>2</sub> is one of hundreds of things that affect our climate. You see, the earth is not a static object. There's oceans, tides, earthquakes, volcanoes, forest fires, sunspots. Did I say forest fires? Last week, there was over 155 forest fires burning in the world. Every one of them is capable of setting our carbon emissions back a hundred years. Volcanoes, for instance, a tremendous amount of emissions better, but our earth is always in a state of trying to become in a homeostatic state, trying to reach an equilibrium. So, we will have fluctuations in our climate. We always have. We always will. Probably not much we can do about it. Getting back to crops. Well, one more thing, the earth is on an elliptical orbit around the sun. That means it's proximity to the sun at different stages of the orbit varies. Then, if you recall last December before Christmas, when Saturn and Jupiter got lined up with each other, they're the two largest planets in our solar system and they can pull the earth orbit a little bit and change that proximity to the sun. So-

Brad Kitchens: Just so we can keep the time to bring it to a close.

Doug Nelson: To finish up, 5% of the plants on earth are in the C<sub>4</sub> category. That means they have four carbons in the molecule that's responsible for photosynthesis. If you compromise CO<sub>2</sub>, your plants like corn uses CO<sub>2</sub> only out of the atmosphere and it takes that carbon molecule off for its own use and releases the oxygen to us. So, if you compromise CO<sub>2</sub>, you will compromise not only plant growth in our food supply, you will also, also compromise our oxygen supply, and oxygen like sex becomes very important if you're not getting any.

Brad Kitchens: I was going to summarize, but with that ending, I really don't. I don't really know how to do that. I'm just going to let that one go. Yes sir. Thank you.

Michael Cumm: I'll admit I'm not as humorous as the last gentlemen, but I guess as a farmer as well, I like to re... Sorry. Thanks, Michael Cumm, I live up in Wausa in Nebraska and I get my power from Cedar Knox Public Power District. I guess I'd like to reiterate the same mindset that the idea of carbon as a pollutant really is troubling, because it's been reiterated again and again and again and again through the educational system and public media, when, as every farmer who was in this room today knows, we can't survive without it. We know it's been increasing because we've been emitting carbon. It's easily measured and no one's really in contention on that issue. But the reality is if you've made a living in the farming industry for the last 30 years, you see nothing but higher yields and better crops, which seems contrary to everything you've been told about a coming disaster. So, the reality is the higher and increasing levels of carbon dioxide atmosphere have only been beneficial at this point, from what I am seeing directly in what I do on a day-to-day basis, raising crops.

I guess, back to the issue of what you do as a district or as a management company with Nebraska Public Power. What concerns me is that the polling data you put up there showed that the number one and number two concerns from the customers of the state of Nebraska is reliability and affordability.

What renewable Energies do is make those two things in jeopardy. I mean, the gentleman from [inaudible 01:44:09] himself stated it. You can have clean energy, clean being carbon reductions, but you're going to pay for it. By definition, the transition to renewable energy is going to lead to an increase in cost. I know they will say that you can have technological advances that will reduce the cost per megawatt of generation. There's no doubt that that's in fact true, but the reality is the power generation from renewable resources we currently have would not exist if it wasn't for a significant amount of government support to make it viable. It would not have happened through natural economic forces. My concern is what if those go away. The key issue, I think is the issue of carbon credits. Right now, we can say Tesla's making \$2 billion a year and I don't doubt it, the numbers are there.

The question is, the carbon credit that's here today can be gone tomorrow. If you build a public power district on the backs of carbon credits, that could be removed by one administration, then where do you find yourself four years down the road? You may find yourself with a public generation of power generation system that is no longer viable, and the cost of maintaining it then gets shifted onto the consumers, and that means me and you and everybody else in the state. People may want to say coal is a dirty word, but the reality is we have coal in a neighboring state of Wyoming with more than we can ever burn. It works, the power stays on, and I, for one, am for more carbon dioxide. If it goes up another percent, I'm all for it. I'm pro carbon. That may be controversial to a lot of people, but quite frankly, I'm all for it. Thank you. Thank you.

Brad Kitchens: Again, comments matter. We want to hear your points of view, and your points of view are very helpful to the process. Yeah.

Speaker 6: Before the next question. So, one of the issues that we're juggling in this balance is that any fossil fuel resource that we use, we're concentrating solar. The natural part of the process are not the problem. It's the concentrations that we're creating, and that's where when we're trying to look at these alternates, we're trying to get the balance. But your messaging is very clear.

Brad Kitchens: I think we have time for one more and then we'll take a break. Sir, please.

Speaker 8: I'm a retired farmer from Hoskins, and I'm a customer of Northeast Nebraska Public Power and also Nebraska Public Power District, both places. I just wanted to talk a little bit about if the board and Nebraska Public Power had thought about the consequences of the green energy movement that they're heavily involved with, and what it will do to the ethanol industry in this state. As I've grown up through the years, I'm in my seventies, and I've seen how politicians think, and they think in cycles of two, four and six years, and what can they do to get reelected? What decisions can I make to get reelected? But they never think what those decisions will do on a long-term basis of 10, 15, 20 years. That's what I would like the board to think about. Maybe they have, of what will happen if the ethanol industry goes down.

Now, I Ag economists from one of the Midwestern universities about a year ago, wrote a paper about the positive aspects of the ethanol industry and what it's done for the Midwest. In his article, he said, it's created 340 to 350,000 direct and indirect jobs. That it has lowered carbon emissions massively. That it has increased farmland values throughout the Midwest, 30% to 40%. Now the energy industry, and I can see how tonight at this meeting, how you're moving towards green energy, eventually we have... Mercedes about two weeks ago, said that as of 2000, they will make all electric vehicles. General Motors, their business plan is 50% electric by 2030, and full electric by 2035. Ford is similar to that. Honda's similar to that. Toyota is the only company that hasn't made any kind of business plan involved with that. But as we're moving towards a fully green supposedly green society, what it's going to do is destroy the ethanol industry.

It will be over with, there'll be 347,000 jobs that will disappear. We'll lose 30% to 40% of the value of our farmland. What's going to happen to the schools in our rural towns if we lose 30% to 40% of our real estate value in farmland. Now in Norfolk here, or Omaha or Lincoln, where a lot of you are from, you have a massive population, homes to pay the property tax to cover your schools. You go to the less sparsely populated counties around here, where there is a small population that land tax is off the farm lands which supports the school systems. Now you drop the farmland 30% to 40% in value, it's going to be devastating to these rural schools. I would just like the board to consider that and think of what their movements in the next few years and what those consequences could be against the ethanol industry as far as ending it. That's what I'd like them to consider.

Brad Kitchens: Well said. Thank you. Do we have one more? Just one more and then we'll pause, please. It's all yours.

Keith: Thank you. Keith Teacher covering Chadron, Nebraska. I get supplied from Elkhorn Rural Public Power District. I'm a farmer and landowner and small livestock owner system. I wanted to point out that one of the gentlemen started talking about solar collector that we are, and Nebraska is a solar collecting state. That's what I do as a farmer, my land collects solar energy. I convert it to crops and livestock. We do have one wind tower, and then that is also comes from solar energy. I like to use on my farm anything that I can produce. I produce ethanol. I produce some electricity now, and I don't see why the state as a whole doesn't look very closely at producing all the power they can, from what they have and in supply of energy, and that's Solar.

I believe that even if you don't agree on the climate change issue, which I tend to agree that we do have a serious problem, even though in Nebraska is probably poised to be one of the safest places in the country to live because of just our proximity. Maybe not in Western Nebraska could have some serious problems,

but even if you don't agree with that, why don't we produce as much of our own energy that we can, from what we have as a resource to use? That's my point. Thank you.

Brad Kitchens: Very much thank you for your comments. Again, they matter. That's why the board's here. That's why Tom and his team are here to hear your input. We were not anticipating this many folks, but I... So, a 10-minute break can come with some risks. But I really ask that you tried to limit this to 10 minutes so that we can come back and hear from Tom and then engage in some more discussion and Q&A. So, I've got eight till, so let's come back just after eight o'clock again. Again, we have to stop sharply at nine. So, we want to give you time for Q&A. So just after eight o'clock we'll reassemble. Bathrooms are right behind me, right behind this wall. Thank you.

All right. Let's get going. First of all, for comments already provided, thank you. Again, that's what we're asking for. We appreciate your thoughtful comments and we hope to continue to get those, and during this next hour. As I just said, we do have a hard stop at nine. So, I just want to remind folks of that. Let me transition now and introduce Tom Kent. I'm sure you know Tom, or know the name. Tom is the CEO at NPPD. So leads the organization and all these challenges along, of course, the oversight of the board of directors. He's going to share with you what the current thinking is of the leadership team and the board, around some of these topics of de-carbonization, generation, portfolio, direction of the organization, et cetera. Then we're going to go back to Q&A. I suspect perhaps many of them will be directed more on the NPPD basis or our experts. I'll be happy to moderate and kind of direct the questions appropriately, but I don't want to waste more of your time. Again, thanks for your comments. We look forward to more. Let me turn it over to Mr. Kent.

### 3.1.1 Discussion Draft of SD-05

Tom Kent: Okay, here we go. All right. You can hear me now. Okay. Well, thank you again for being here tonight and participating in offering your comments. As Brad mentioned, we'll have more time at the end for more comments or questions potentially, and we're working on the technology as we go through it. I really appreciate the presentation from our peers from EPRI. I thought they did a really good job kind of explaining how the industry works and the issues that we face as an industry and what we do behind the scenes that hopefully you don't have to think about a whole lot, right? Other than the lights are on, and then probably the other time most of you think about us is when the bill comes once a month, whether it's either coming from us as retail or from your power provider, one of our wholesale customers. That's how we like it.

As was pointed out in the first hour, it's pretty complex things where an unprecedented change and dealing with and addressing the issue of business risk related to the emissions of our power plants is something that we focus on all the time, whether it's traditional emissions and traditional pollutants that have been regulated for decades by the federal government or some of the new things that we think about in terms of carbon emissions and how that impacts our operations and what we need to think about going forward to ensure affordable, reliable, resilient, and the right level of sustainability, the mix, the balance, as we talked about, of all those important things to provide the service you expect and count on every day.

One of the things that our board does is they establish what we call strategic directives and what those things are, are policy guidance that the board sets for management. We have strategic directives on cost

competitiveness. We have strategic directives on reliability. We have strategic directives on safety, financial accountability, several different areas. So, this is the board in their role, elected by you to provide oversight to the operations of the district, setting that policy guidance for the district. What we're talking about today is a specific strategic directive that we've been discussing with the board and our customers for a couple of years now. We call it strategic directive five, which has to do with our resource mix, and the carbon emissions from that resource mix, and whether we should set any goals for reducing that further over time. As we pointed out in the previous discussion, we've come a long way since the 2005 timeframe, you can see that we have been on this path for quite a while.

How do we continue to go forward? What's the best way to do that, to ensure that reliability, resilience, affordability, and meet our sustainability goals? That's what the strategic directive's about. We started a process with our customers and a board a couple of years ago. In fact, Brad helped facilitate that as well, where we brought a sub team together. Some of our board members, some of our customers, some of our staff start to talk about the business risks, start to think more about what's going on around us and industry, what our customers are starting to demand and expect in terms of the types of services we provide them in the future. To think about this discussion and the risks around it and the opportunities.

I really liked how you frame that because there's opportunities as well. We have a group that's looking at a lot of opportunities right now, looking at things like, can we do economic carbon capture and sequestration? Can we partner with the ethanol industry in Nebraska to help them manage their concerns and their business risks around their carbon emissions? Because it's important to them as well, and it's important to our customers, and it's important to farmers, and we're working with them to find ways to help them ensure their products continue to be competitive going into the future, and this is the one of the many things they look at. One of our customers has a large industrial customer that's very interested in ensuring that the products they make have the attributes that they're looking for, and they're looking for this particular customer, a hundred percent of their power to come from renewable sources, not just carbon neutral or carbon zero, but specifically renewable. We're in a project with them right now to help them figure out how can they accomplish that with us and our wholesale customers, their power supplier.

That's kind of the framework, kind of the things we're looking at, and part of the discussion and part of the reason we're here today is to spend a little time introducing the board's current thinking. Management's current thinking about what this policy directive should be. Ultimately the board will be making a decision on what that policy directive should be. A piece of that decision process is hearing from our customers. That's the reason we're here tonight. That's the reason we've opened up a survey today to allow you all to provide those survey responses over the next three weeks. You can find that survey on our website, [nppd.com](http://nppd.com). We mentioned that at the beginning. Our customers are also promoting that on their websites. It's important that we hear your feedback. Again, thank you for that feedback tonight.

Our policies is a one-page policy document. Again, this is a discussion draft. It's not a final product. It's meant to stimulate discussion. It's a starting point that I think we can gel around and determine whether it needs to change or how it needs to change. Ultimately the board will decide what it should say or if it should say anything. The first paragraph of the policy is really kind of the preamble. It's recognizing that the emissions of our power plants is a business risk that we need to understand. It's a business risk we need to manage as we manage all the other complexities of our business in order to ensure low cost, reliable electricity for you. So that's really what this first paragraph is about. I'm not going to read the whole thing, but that's really what it's about. Set the stage. It's the preamble.

Second paragraph, straight forward and simple. This is the goal that the board will be adopting. Again, assuming they approve it. I say, will be with this mountain of certainty, the board will be having significant dialogue and discussion. Ultimately, whether they gets adopted that it looks like this, it doesn't get adopted at all, or it gets adopted as something different, will be the result of the board's discussion. So here we are for the draft, I'm writing this as if it's happened, but we propose, we adopt a policy of achieving net zero carbon emissions for our generation resources by 2050. So, we continue on that path of assuring low cost, reliable energy supply, while reducing the carbon emissions over time. Lots of ways we can do that. We can do that with new technologies in our fossil units where there's carbon capture those kinds of things.

If they prove to be economical, we can do that with our continued presence in nuclear. We can do that with hydro resources. We mentioned hydrogen. That's something that we've been very interested in and very focused in looking at hydrogen as a potential new way to generate electricity in a carbon-free manner. We are one of 21 entities in the United States, 21 utilities in the United States that have the technical capability, the people resources, and the knowledge to safely operate a licensed nuclear commercial power plant. That's a pretty good competitive advantage when you think about your resource mix and how that relates to carbon emissions. So that's something that's important to us. That's part of that mix. There's a lot of ways we can do this.

We're working on pilot projects with Ag industry CVA agriculture this year. For example, we started doing some pilot projects on working with farmers and stuff on Ag sequestrations of carbon dioxide. Heard it in some of the comments, carbon dioxide and carbon is very important to the Ag economy, right? It's what makes sense photosynthesis work, it was what makes plants work well, you can you improve soil quality, get better soil production, those kinds of things, and also maybe get some benefit for capturing some more carbon dioxide in the soil, so some more carbon in the soil.

So, the next this one, the next paragraph says is, the board says, okay, and this is one of their big roles. It's probably to provide oversight of the management. The expectation here is that management will report at least annually on our emissions, and we'll report it both on a total tons of carbon dioxide emitted. We do that today, and on the intensity of our emissions. Intensity is really the emission rate. It's like the fuel economy of your car. The miles you get per gallon, intensity is the pounds of carbon that are emitted per megawatt hour that we generate. So, we're going to report both, both numbers are important. Both numbers are numbers that we continue to monitor as we move and transition down this path. As we work with EPRI as part of their initiatives, to help us understand better ways to manage better ways to ensure that we meet those four primary goals.

The last paragraph basically is about [off-ramps 02:03:27]. Reliability is important. Cost competitive is important. The boards established strategic directives or goals for management to monitor both of those. If the board feels at some point in the future, that the carbon emissions' goal that they establish is causing issues with our ability to meet those other important goals. All they're saying is they're going to step back and reassess and see if changes need to be made and whether they want to direct management otherwise from a policy standpoint. So that's really what the fourth paragraph is about. It's to provide-

PART 4 OF 6 ENDS [02:04:04]

Speaker 9: So, that's really what the fourth paragraph is about. It's to provide that opportunity and to ensure that management stays focused on the right balance of affordability, reliability, resilience, and our sustainability goals. And that's the meat of it. That's it. It's one page; it fits on one page of paper. And it's a starting point for discussion.

Back to you.

Brad Kitchens: Yes, sir. I think we have, surprise, two more polling questions, and then we'll open it up. But we'd like to get your thoughts on what you just heard. So the first question... I got to read it myself; is this a prioritize or just pick one? Just pick one. In your opinion, is a net zero ZCAP goal by 2050, you can see it, too ambitious, about right, not ambitious enough, or I just don't have an opinion at this point?

Net zero. So that third category that Bill talked about. Lots of degrees of freedom in there. Lots of things you can do by 2050. Does that strike you as about right, or too much, or too little?

(Silence).

I thought on this one, instead of getting up to new R50, we'd probably punch through like 75.

Speaker 9: Evidently the other 25 are in NPPD staff.

Brad Kitchens: That could be. There's a lot of people there.

All right. So results are, not quite the... Before it was not evenly split, but there was a strong yes and a strong no. This is a pretty much, I'd say, a stronger too ambitious, although there is still a pretty healthy second which is not ambitious enough. So again, it's binary, which makes it tougher. It's hard to satisfy everybody. I will say, you probably all surely know this, just a quick bit of commentary, and it doesn't mean it's right or wrong, but if you look at other utilities in the country, by far the most likely goal that most of them would have right now would be a 2050 net zero. Now some are much more ambitious: 2040, 2035, but 2050 would not be uncommon at all across the large utilities across the country.

Let's look at the next question. So, the goal presented is a 30-year aspirational goal, 2050. How often do you think the goal should be formerly re-evaluated by the board? So, he said it's still a draft, it's not final. But assuming that this is where they land in several months, how often do you think is appropriate to take a hard look at the direction, at the economy, at the science, at the competitors, in terms of revisiting whether that should be accelerated or relaxed? One to five years, six to 10 years, or let it ride 10 years plus.

I bet we see a whole bunch of A's, but I don't know. Let's go ahead and see the results. Yeah. So, I think regardless of which side you are on the fence in terms of if you like it or don't like it, I think everybody would probably agree, and I don't think the board would disagree with that either, we had to continue to take a hard look at it, a frequent look at it to make sure if it needs a reset, up or down, that we're always doing that; which I think is one of those paragraphs that Tom talked about: let's make sure this is reported on very frequently on two different metrics, so that we can monitor the progress here.

So, with that, we have, and again I've said it too many times, 40 minutes. We'd love to... Oh, we have one more?

Speaker 10: One more, yeah.

Brad Kitchens: This is our first night. I haven't memorized this presentation yet. It'll be better tomorrow night; I'll know how many questions we have. One last question. Of the information presented tonight, what do you feel you need more information on? So, risks associated, or opportunities, as Bill said, associated with being a carbon emitting utility; more about the core utility principles and that balancing act between those items; more about NPPD's carbon reduction discussion draft and thinking; and I don't know, I just need more information at this time. I just don't know. Which of those four would you land on?

(Silence).

I'm betting B, but we'll find out. Let's go ahead and see.

Oh.

Speaker 9: Oh, should've taken you on, on that one.

Brad Kitchens: I know. I had a dollar out there. So, again, pretty evenly split across the three top items. But the most votes goes to a better understanding of the thinking and the process and the logic and the rationale behind the current discussion draft that Tom put forward.

Okay. So, with that, ladies and gentlemen, we have again, 35, 40 minutes, whether it's a question for our experts or for Tom or whether it's a comment, we'd love to hear it. And as always, please, if you could, just your name, city, provider and affiliation if any.

Yes, sir. You're up.

### 3.1.2 Second Public Comments

Brad: Am I on?

Brad Kitchens: You're good.

Brad: All right. Okay. I'm going to have a little different tack than most speakers have had. My name is Brad [Greer 02:09:53], I'm from South Sioux City, and we get our power from the municipal power supply there in South Sioux City; it's a municipal organization. It has been alluded to that wind is not a desirable thing for you. In Iowa, 60% of their power now comes from wind. This is as of April, and that is from the US Energy Information Administration. So other people are using wind. The power problems that came from wind in Texas, was because they did not build those turbines to handle that weather. In Iowa, and I live right across the river from Iowa, so I hear all this stuff, they have heaters in their turbines. In Texas, they didn't have heaters in their turbines. So, they had problems. So, I wanted to point that out.

Carbon is kind of like water. It's where it's at that's important, not how much there is. I would invite everyone to look up the UN Climate Panel Report that was released three days ago. And I just pulled up a summary from Reuters on the internet. Something just has to be done, and it's through things like this, and it's a give and a take. But Nebraska is a wonderful place to live. I think in terms of sheltering from the weather problems around the world, Nebraska has got it made. The cost is being borne by the people that do not live in Nebraska. It's not being borne by us, it's being borne by the people that live in low line areas, it's being borne by the coastal cities in the United States, it's being borne by the nations that depend on our ocean currents. Our ocean currents are starting to change because of the salinity in the water is changing, because the glaciers are melting. Great Britain is going to have a lot of problems when they lose the Gulf Stream, and they are losing. It is weaker than it's been ever since it was measured.

That's all I wanted to throw in. Thank you.

Brad Kitchens: Thank you, sir.

Again, I can't resist commentary, one very quick comment on the February experience and it wasn't the windmills is that the primary problem was not renewable. The primary problem was the gas system froze at the wellhead, pipelines and everywhere else. So, the primary problem in February, particularly in Texas, 50,000 megawatts of a 70,000-megawatt problem was the gas system froze because they just did not have it winterized and equipped for that kind of extended period of cold weather. It gets misconstrued sometimes as a renewable challenge. And although there was some renewable issues, it was primarily gas.

Yes, sir.

Paul: Hi, Paul [Montse 02:12:39] again here from the college. My question really is in response to some of the comments in the first half, I was hoping that the experts could respond to some of that. Specifically, ideas like we hear about this ice age that people talked about in the '70s. My understanding is the media talked about it a lot, but there was no scientific consensus. Talking about, as the previous gentleman had brought up, it's where the carbon is at. Nobody's demonizing carbon. We're made of carbon, and I'm sure that we're all hopefully kind of like ourselves a little bit. So, if the panel could speak a little bit more to the science of where we're at right now.

I'd also like to thank the gentlemen from the first half that talked about, we can't count on carbon taxes or anything like that to, I don't know how much that should be playing into our thought process but thinking about the science of where this can take the rest of the world. Even if we're okay here in Nebraska, if California's burning, we're breathing that. And if the temperature goes up to a certain degree where we can't grow crops here anymore, that hurts our farmers.

And so, I'd just like to hear a little bit more about the science, if the panel has any expertise on that.

Brad Kitchens: We did say we don't want this to be a science debate, so I'll just use that as a ground rule. But maybe again, if you have one or two minutes of comments on the science and your thoughts.

Paul: Yeah, just clarity, not a debate.

Brad Kitchens: Yeah, I'll offer a comment. So obviously there's a lot of science. And when we say the science, I mean it's a huge body of work that's going on at all levels. I want to come back to the comment that was made about carbon being a benefit for growing crops, the science that excites me the most is the science of getting carbon back into the ground, where it's of benefit; fixing carbon in ways that are beneficial. Now there's lots of talk about extracting from the air and injecting it in deep into the earth. Maybe that'll work, sounds really energy intensive, maybe an electric load that would benefit. But really, I think that there's lots of aspects to the science. We need to pay attention to it, and we need to pay attention to all aspects of it, but there's also solutions there if we're willing to take them, and ways to reduce carbon emissions appropriately, and cost-effectively using science.

So, I'm sorry I'm not a climate scientist, so I can't really comment on that, but I think that's-

Paul: [Inaudible 02:15:05].

Brad Kitchens: Okay. My only add to that would be, and I appreciate we could come up with a thousand really wonderfully written and research papers on either side of that science. So, I personally set that aside and I say, regardless of the science, there's a wave of momentum around the world that is upon us, that you cannot ignore. And again, agree or disagree, I am not arguing one way or the other. But the wave of momentum is here and you can't turn your back again on it. That would be my answer. Yeah, thank you.

Others. Yes sir.

Rick: My name's Rick Yoder, and I've been an NPPD customer in Cass County since 1992. Any other identification needed there?

Brad Kitchens: We're good.

Rick: I just have a few observations. One, about false equivalencies and saying a thousand on either side. I'm not sure the numbers actually stack up that way, but I'll go beyond that.

Brad Kitchens: I was winging it, but yeah [crosstalk 02:16:05].

Rick: Oh, yeah. Things to keep in mind, I'm really glad about where this is going. I think that you're doing a good job. Thank you board members. I've married into the state of Nebraska. I got married down the road here at the Lutheran church in Albion. I think I got a board member from Albion here. So anyway, you guys are doing a good job. The things I would like you to keep in mind is, I liked the idea that the gentleman said last time, of keeping the energy generation local. I think vibrant, clean energy... And Dr. Christopher Clark, are you're familiar with his modeling work? He did energy studies for both the state of Colorado and the state of Minnesota, where he showed that a larger investment in renewables and distributed energy resources, can bring you close to, he didn't go with a hundred percent, decarbonization, but that 80% or 90% at a faster rate, and end up lowering the rates for everybody in the state, even those who don't drive electric vehicles, even those who don't choose to use electric water heaters.

So, I think it's useful to look at those studies, to recognize that an investment now can lead to long-term savings, and then economic savings. I'm a little tired of sending all of our money to Wyoming. We have

the resources here. I would just assume that we keep our energy dollars in the state of Nebraska. That's my view.

The costs do go up exponentially, is my understanding, as we go to that last 80% or 90%, just like as we go to that last mile of a customer for distribution; those costs go up. I personally would be okay with an aspirational goal of a hundred percent. But the reality is, I think you need to do that one-to-five-year judgment as you get closer and closer, for that last 10% or 20%. I struggle with the either war versus the both end that we're forced into with our questions about reliability, affordability and environmental sustainability. I have used, and I know people that use, a balanced disc at their desk that they stand on, and it builds core strength. And I think if you don't understand the three as a balance among the three, then you end up tipping over, you end up not building that core strength of an organization.

The other thing I haven't heard today is that decarbonization does offer huge economic benefits, in terms of new jobs, in terms of local jobs, in terms of differing with renewables, deferring the taxes from the landowner, such as myself, to those who own the renewable resources, with the PPA, with the wind power. I've seen it up in Boone County. I've seen the people who have that wind on their land, they're doing pretty darn well, and the community schools are doing pretty well too. Not to mention, with lower, more distributed solar generation, you have people that have to have those skills in those small communities as that goes out.

Brad Kitchens: We have a few people lined up here.

Rick: I've gone on a while, you're right. And I thank you for listening.

Brad Kitchens: Thank you for your comments. Those are helpful, thank you. Didn't mean to rush you, but I just want to make sure we allow others. So, thank you, sir.

Yes, ma'am.

Lauren : Hi everyone.

Brad Kitchens: Hi.

Lauren : Can you hear me now?

My name is Lauren White, I reside in Wayne. We're powered by WAPA and NPPD. So, I'm a junior at Wayne State. I study environmental pre-law and political science. I'm studying to become an environmental law attorney. I know some of you are skeptical of how efficient clean energy is, but I want to address how crucial it could be for us. Other highly developed countries have already begun the transition to carbon neutrality, but we can lead as a state in the innovation of clean energy. We have a fantastic potential. Investing in clean energy in Nebraska not only protects the environment, it creates more jobs, healthier communities.

Let's talk about wind energy. In Nebraska, yearly we generate \$12 million in property tax revenue from clean energy alone. Our neighbor, Iowa, generates 69.5 million each year because of wind. Instead of sending our tax dollars to Wyoming for fossil fuels, we could be energy independent, investing in our own

economy. Out of 520 milliwatt-hour, coal power plants use 12 million gallons of water per hour. Coal is about \$34 per megawatt per hour, versus \$26 megawatt per hour to produce wind energy. Sorry.

Regarding the health of our communities and our planet, clean energy is emission-free, guaranteeing safer jobs. Clean energy, in 2019, brought three times as many jobs as the fossil fuel industry. Compared to coal, in coal factories, people are at risk of respiratory disease, cancer, and early death. Sorry, guys.

Great jobs mean more younger people to stay in rural Nebraska, like me. A great example is Dickson County, who generated \$11 million in spending in local companies, and brought about 300 construction jobs. Each year, we hit record breaking temperatures with increasing weather patterns including droughts, that cause intense fires, floods, harsher hurricanes, and rising sea levels. The recent IPCC report that came out on the 9th of this month, which was based on 14,000 different studies approved by 195 governments, told us about some troubling news. If we don't start cutting our emissions now, temperatures could rise to two or three degrees Celsius, which could affect our agriculture, our water quality, our health and our economy.

The truth is, climate change is also a racial justice issue. It disproportionately affects marginalized groups because of redlining Jim Crow laws. It disproportionately puts these people farther away from grocery stores, hospitals and schools in areas that are at higher risk of floods and hotspots.

My generation is fearful for our future. And we are unsure how inhabitable our planet may be. Many people are too afraid to have children. I've had that discussion with other people my age. Investing in clean energy is not only economically better than non-renewable energy, but it also is a key for protecting our future generations. It's an equitable right choice for Nebraska.

Thank you.

Brad Kitchens: Thank you for your comments. Hey, and good luck next semester.

Tom Reddoch: [Inaudible 02:23:49].

Brad Kitchens: Please.

Tom Reddoch: The last couple of speakers, I just wanting to add a couple of thoughts in the process. One of the main things to keep the electrical system totally sustained is the continuous availability of supply. And one of the large issue that we face with renewable technology is we don't have it. We also don't manage the fuel supply. Nature or the weather manages that fuel supply. So, all we [inaudible 02:24:37] is we can buy a certain resource for a limited number of hours of per day very inexpensively, we must find alternate technologies to fill the gaps when the sun is not there, and when the wind is not there. And this is the complexity about where we are today.

And I've been waiting, I was expecting someone to pose the question. I haven't heard the word storage emerge. Storage is one of the options of taking something that's intermittent, and allowing it to be spread to many other hours. We do that really well with hot water, don't we? With very few exceptions do we get hot water on demand. Most of it comes out of a tank. And one of the reasons being it's the lowest cost way to generate your hot water.

So, we have a lot to learn. And the climate questions that were being asked earlier are legitimate questions. We don't exactly know how complex that chemistry is. One of the things that we do know, I made the comment a little earlier about concentration, is that so long as carbon is tied up, let's say it's the way it occurs naturally, it's not really an issue. It's only when you unleash it that we're trying to learn how to manage that, just as we're trying to learn how to use these alternatives.

Technology is nothing new. Every time we've gone through an industrial revolution, what have we done? We've set one body of technology aside and we adopted another. And I lost the speaker out here a moment. And the answer to dealing with those transitions is job training. I've spent the last eight years at EPRINC working on how to transition people from jobs they're in to new jobs. And our big investment training is crucial for that.

And the last comment I want to make, these things don't happen in five years, they don't happen in 10 years. Most of these things are 30-to-50-year transitions. And the comment is just like, why do you go to a doctor for a physical exam? You're trying to anticipate what changes in our physical bodies may make, and we get that by periodically, at least asking the question. And that's what we're kind of encouraging you to think about.

Speaker 10: Thanks Tom, thank you.

Brad Kitchens: Yes, sir.

Josh: Very good, thank you. My name is Josh Moenning, I'm the mayor of the city of Norfolk. I want to thank you Tom and the board members for being here tonight, and thank you for choosing Norfolk to be your first in the series of public input sessions that you're doing here in the next couple of weeks. I just want to make a few points that hopefully bring some local flavor to this discussion. I, again NPPD is our contracted power provider here in Norfolk. And in terms of full disclosure, I have worked professionally in the field of clean energy development. And I'm proud of that fact for various reasons, but I think this discussion is very relevant to your deliberations as you go forward with a strategic directive, because clean energy can be and must be a part of the solution for carbon reduction.

And it's also been touched on tonight, but I want to talk about it a little more in full in terms of the economic benefits that our state is seeing from clean energy production. Norfolk and Northeast Nebraska are really the hotbed of activity and clean energy development in recent years. And so I think Norfolk and our region, are living proof of some of the economic benefits that we're seeing from being an energy producer. Historically, Nebraska is not an energy producer. We're not an oil or gas or coal state, but we are a wind and solar state. We have surprising levels of potential in both resources. And what that means in Norfolk, it's meant new jobs have been created here. Both in the construction phase of these energy projects, over the last three to four years, we've had, I estimate, 800 to 1,000 wind farm construction workers here in Norfolk. If you go out to dinner downtown after this, it's all you're going to see: wind energy trucks, up and down Norfolk Avenue, because those workers are staying at our hotels, eating at our restaurants, drinking at our bars.

That's been a big boom to Norfolk. Sales tax receipts, I don't think by coincidence have been at record highs here over the last two to three years, even in the midst of a pandemic. It also has meant new farm

income. So farmers in our area are getting paid the equivalent of a part-time job they don't have to show up for, for land leases. That's a big deal. And cumulatively, that number is \$15 million plus per year in Nebraska right now in farm lease payments.

It also means new tax revenues. Counties and school districts are benefiting from the taxes being paid on these projects. For example, local school, two failed bond issues, didn't need to go to a bond issue, this is the last time because they were able to finance half their school's renovation and expansion project through wind farm taxes. That's significant in our small towns.

It's also attracting new business investment to Nebraska, to the tune of more than \$4 billion in the last four to five years. If there's another industry in the state that's invested that much in rural Nebraska and now about out of time, I'd like to know; I'd be curious. And that development and that investment is being driven by the corporate marketplace. This is a product that is in demand in the corporate marketplace. Just in Northeast Nebraska, we have Facebook, Target, Pepsi, Smuckers, Hormel are just a few of the examples of companies that are buying into Nebraska wind farms. And they're doing so because there's a business case for renewables now. The cost of producing electricity from wind and solar have fallen greatly in the last 10 years; as we've discussed tonight, wind to the tune of 70% in 10 years, solar around 80% cost reduction in the last 10 years.

So recognizing all of this, the city of Norfolk has been willing to put our money where our mouth is, and engage with NPPD on a project, establishing a community solar system here in Norfolk. You'll see that become under construction here in the next couple of months. It's an eight and a half megawatt project tied to a battery energy storage system, because we think that's important. It will be the first of its kind in scale in the state. We're very proud of that fact. We did that because we will be able to realize cost savings in that. I think we will be the first project in the state, of such a community solar project, that will allow people by buying into it to save costs on their energy bills. And that's a big deal. And we have citizens and businesses who want renewables, and therefore we want, as a city, to be able to utilize more renewables.

And I'm going to end on this point, I think part of the solution in helping NPPD reach its carbon reduction goals, is potentially allowing for more qualified local generation within its municipal customer base. We were capped at that eight and a half megawatt scale because we have a restriction or a contract now that caps us at 10% of our peak demand. So, we're 85 megawatts, eight and a half megawatt solar. We'd like to do more. And these are discussions that we're having with NPPD, as we deliberate our city's energy future. And the decision that will come out of this process, will have a large role in what we decided to do for Norfolk's energy future.

We want to see more flexibility, we want to see more distributed local generation, because it makes sense for our customers, our citizens, and it makes sense for supporting our local economy. And we want a provider and an energy source that recognizes those benefits. And given Nebraska's opportunity now to be an energy producer, that is only going to continue to benefit us as a community, our region. Northeast Community College, I should have mentioned, is the home of the only accredited wind energy training program in the state, and those students that are graduating from that program are taking jobs in Northeast Nebraska, whereas 10 years ago they had to go to Iowa and Minnesota to find jobs. They're able to stay home now, and build good paying careers in our hometowns.

So, all that said, we think that, again I'll make this point, it makes sense in a reasonable way. We understand that there's not one solution here. I think even some of your consultants came to the conclusion that the future generation mix is something like a third wind, a third solar or a third natural gas. We understand that there's got to be diversification. But we think that it makes sense to create our own energy here and use it, instead of hauling it in on a coal train from Wyoming.

So, thank you for your time.

Brad Kitchens: Thank you, Mayor.

Yes, sir. We have just a few. Yes sir.

Art: Hi. My name is Art Tandra. My wife Helen and I, own and operate a farm north of Neely. We're in the Elkhorn Rural Public Power District. Thank you for having this session tonight, it's been very informative, and we hope you get some good input. We're very concerned about the current and rising levels of carbon dioxide. We're concerned about the world, that our grandchildren will live in.

PART 5 OF 6 ENDS [02:35:04]

Speaker 11: We're concerned about the world that our grandchildren will live in and wonder if our great-grandchildren will be able to survive. On farm, we love carbon dioxide, as some people have mentioned, but we're working to sequester that carbon through no-till and cover crops. We put it in the ground and use it there. Tonight, we drove our electric car here, that we charged off our solar panels that we've had for seven years and have been very cost-effective. We are all trying to do better and we can all do better, as NPPD, as a rural electric system, and as individuals.

On Monday, the United Nations Intergenerational Panel on Climate Change released a report, and it was called Code Red for Humanity. I encourage every one of you to take a look at this, or at least pull it up and look at the highlights of this report. Hopefully you will see why what we're talking about here tonight is what they're talking about.

NPPD's challenge is to determine how fast we can get to that net zero. I think it's been indicated that by 2050 is kind of expected. That means, how fast will we transition from coal and natural gas to renewables? Cost, reliability and redundancy are extremely important and can be achieved through renewables and storage, just like was mentioned earlier in Iowa, they're doing it. The technology is here, the battery technology is here, and everything is getting cheaper and better as we work towards this net zero goal.

As long as coal has been used to produce electricity in Nebraska, we've helped the Wyoming economy and the railroad. They got rich, we got electricity, dirty air and health problems. As we have seen over the past several years, building renewable energy in rural area has brought many benefits. Small towns are coming alive, young people are moving into rural areas for great jobs. Many young people see an opportunity to come back to their local communities for great careers and lifestyles. Farmers have seen a new source of income on their farms in these very troubling times. Small school districts are seeing new students and new resources. Counties benefit from the tax increases. Just as each of us must do better in our own lives to make this world a better place,

NPPD has started down that path, but they must continue to do better. They must continually respond to this new Code Red for Humanity and move as rapidly they can to net zero. Thank you.

Speaker 12: People standing, and again, we only have about 10 minutes, so my request is some brevity if we can. Thank you for your comment though, very helpful. Yes, sir.

John Hansen: John Hansen, I'm the president of Nebraska Farmers Union. My farm is in Western Madison County and so we get our power from Elkhorn Rural Public Power District. My organization helped build the public power system, and so if you think about it, it's like a publicly-owned cooperative. We helped organize about 445 cooperatives across the state. Everybody who showed up at this meeting tonight, put on your owner's hat, not just your customer's hat, because we're the owners of our public power system.

Successful cooperatives are cooperatives that have owners that are invested and spend the time to think like owners about the overall best interest of their cooperative, not only where it's at, but where it's going. I thank the NPPD board of directors and their management for giving us the opportunity as owners to weigh in. Especially in this particular space, the Gretzky quote, and it's really not Wayne's quote, it's his dad's quote, is that the trick is not to skate to where the puck is, the success comes when you skate to where the puck is going to be.

If you take a look at where we were 15 years ago, if you go back to 2005, the thought of having five to 7% renewables as a part of the mix was, to most utilities and public power, was a scary thought. Yet, because of the technology and where we have gone, we've now got Lincoln Electric System is at 49% of their retail sales come from renewable energy and I think OPPD is about 37.4%, if I was guessing.

One of the considerations for us as a farm organization is also to say the rural community is really important to all of this decision-making, and if you can get a two for one benefit, then that's better. The numbers I crunch says that thanks to wind, we've got 10.6 million at a minimum, probably about another five million by the time you put capacity factor in farm income because of wind. We have 17.67 million of new local taxes. We have 180 direct, good paying jobs, we have 3,000 indirect jobs. We have 4.66 billion of capital investment, which is close to what the ethanol investment of five billion is.

Of all the things that we've done in rural Nebraska for rural economic development, ethanol and wind are the two biggest new investments of capital. All of those things are money that goes through our local economies and helps us keep our kids at home. Thank you much.

Kat Warner: Hello. There it is, all right. Good evening, everybody. My name is Kat Warner. I live in Plattsmouth, Nebraska and my electrical provider is NPPD. I am a senior at UNL, majoring in economics. I'm also one of the top 10 people in this room that's under the age of 30.

Speaker 12: Ouch.

Kat Warner: First, I would like to thank the NPPD board members for making this topic a priority. I also thank you all for letting us come here and for hearing our voices and listening to our words. I'm a born and raised Nebraskan and originally from Plattsmouth, which is just outside of Omaha and next to Offutt Air Force base.

I am here to talk to you all about my future and how setting a carbon neutrality goal by 2040 is in the best interest of it. Setting a de-carbonization goal is common sense and we've all been listening to the economic reasons behind it. There is not an economic seminar that I go to where the environment isn't talked about and de-carbonization is thought of negatively. Everybody's talking about it, and it's just the way of the future.

In Nebraska by the end of 2019, there were nearly three times as many jobs in the clean energy generation sector as the fossil fuel generation sector. As we've heard, it's because we are currently sending our tax revenue, our jobs and our money out of state when we could be generating in-house homegrown Husker energy. Local taxes paid by wind and solar projects alone could total 2.7 billion in 2030, allowing rural town and county governments to invest more in public services in school districts.

Climate experts and energy experts agree that fossil fuels are no longer going to be realistic or economically viable. This is something that I'm learning about every week in my classes. We are saying there's 1,000 papers written about climate change, more than 970 of them concur that climate change is happening and caused by humans. That's what it means when we say 97% of climate scientists agree and it's true. That's what the Intergovernmental panel on Climate Change report—is vital, important—says.

That is why I am here, because what is the point in sitting in a classroom a hundred miles away when the people sitting in this room aren't doing anything with the information that I'm learning? Coal is disgusting and the coal plant owned by NPPD is the largest source of air pollution in Lincoln. I am breathing pollution as I'm walking to class.

Then there were 206 countries that competed in the Olympics. The fact that one of those countries puts 15 emissions in the atmosphere, it's a lot, and the fact that it's us is a lot. We would receive gold in being the largest emitter per person. Any plan or policy that does not include cutting emissions at the source, starting today, is completely inefficient and insufficient for the future ahead of us.

Currently, NPPD runs on less than 15% renewable energy. Before I have my midlife crisis, I want to see that number rise to 100%, and I'm not the only one. Yeah, this sounds hard and it's going to be, but unless we start facing this problem head on right now, together, we won't be able to solve this in time.

I am here to remind our board members that you were elected to your position to learn the facts and make educated decisions. We put our trust in you when you were elected to make the decision that you have learned to be best, through listening to experts. You paid thousands of dollars to two different consulting companies. Listen to them, don't ignore them. Don't ignore the experts, especially when you paid them thousands of dollars.

There must be leadership in addressing climate change because my generation cannot afford for things not to change. Other generations have failed us by not adequately addressing this problem, but the failures of the past don't have to define the future. Change happens through leadership, which many of you know, which is why you're on the board and in this room. Please vote and act as if you were my age, and I am 21, because at one point you were, and in another point, I will be yours, having to do the same thing for the next generation. Thank you.

Speaker 12: We have a couple more. Thank you. Yes sir.

Dean Smith: Well, first off, I'll apologize. I didn't plan on being up here twice, but I had something. Dean Smith, Brunswick, Nebraska, Antelope County, North Central Public Power. A comment was made by Mr. Kent about working with a customer that wants to be a hundred percent renewable. That was what I tried to touch on earlier. I just have to come back to it and ask question and get an answer to it. When you read about this in the June 15, 2019 Omaha World Herald, there's an article about Facebook moved into Papillion, and I know that's through OPPD. Facebook committed to using a hundred percent renewable energy to power its data center, which is buying from the wind farm, Rattlesnake Creek Wind Project in Dixon County.

Okay, so I go back to that mid-February time period, where even in Nebraska the wind towers weren't generating electricity. My question is, and this one that you can't answer, but I'd like to throw it out for people to think about, did Facebook and Papillion go dark while OPPD was having rolling blackouts in Omaha? Because if they're getting a hundred percent from Rattlesnake Creek, then that means they had no power. My question that I hope you can answer is saying that you have a customer that wants to be a hundred percent renewable, if I look at August 5th from your website, that tracks your energy production, of your potential 500 megawatts of wind energy that you have access to, from 9:20 AM, August 5th until 5:20 PM, August 5th, there was less than 25 megawatts of power generated by the wind. If you have a customer that's a hundred percent renewable, will he then go dark for that time period if that actually happens?

Adding more wind, for easy math, as I can understand, if they're producing zero, we can increase towers by 200% and I believe 200% of zero is still zero. When I read these, well, I call them misnomer, that they're buying a hundred percent of their energy from wind energy, then I hope they're hooked directly to them and that's where it's coming from. Thank you, and thank to the board for having this and holding this here. Thank you.

Tom Kent: I appreciate the comments. Going back to some of the stuff from the first hour, certainly if someone is, quote, off grid and their power supply is renewable, wind or solar, then their lights are going to go off if they're not connected to the grid, right?

Speaker 14: Right.

Tom Kent: Okay, okay. They're connected to the grid. That's one of the big things that we do in the utility industry and managing this big machine, is to ensure that we provide reliable service. How do we accomplish that with a customer that may want to be a hundred percent renewable, like you mentioned with Facebook and the customer I mentioned? We look at it on average for the year. We know what their usage is going to be for the year so we work with them to provide them a portfolio of resources that on average for the year will generate that amount of energy to cover their usage.

That's where, we talked about this a little bit in the first hour as well, the idea of renewable credits or carbon credits, that's basically what's happening on average for the year. They're going to use X amount of energy on average because they know how much they use on an hour and they know how that changes through the day in the month, so they can predict what they need for the year. We find them a portfolio that on average provides that amount of energy over the year, with all the ons and offs that happened in

the middle. Then the arrangement, the financial arrangement that allows them to do that, takes advantage of the credits.

Speaker 12: Thanks, Tom.

Tom Kent: That's how it works in order to keep their lights on.

Speaker 12: Two more and then ... Yes, ma'am, and then we'll end with you.

Debbie Bourque: I'm really short here. I'm Debbie Bourque. I'm from the Allen area. In fact, it's kind of funny I follow him, I have a wind turbine in the Rattlesnake Creek Project. First, I want to say thank you to the board for coming, but I'd like to thank everybody for coming because it's great to see people come out and I appreciate that the board has allowed this.

I just want to reflect a little bit on the turbines. We have environmental damage from the turbine construction process that on our farm we'll experience for a long time, from compaction of how the building has to go on, and people never talk about that. But what I would like to say is that I think tonight we saw that reliability came to the top every time, and that's what's most important for me. I farm with my family. I have three 20-somethings back on the farm, so we've got three generations working side by side on our farm, that we're all concerned about doing the right thing, but we need to remember that Nebraska is one of the best food growing states there is. The reliability that I need on my farm is the most important thing, because I'm growing chickens to put 20 million meals on tables a year. It's providing a ton of jobs, and if I lose electricity for very long, that's a lot of food that goes to waste. I'm just one farmer in the chicken business and multiply that by a lot.

Let's talk about the beef we raise here, some of the best in the world. If we don't have reliability, we can't continue feeding the world the way we do. I just want to say reliability was key tonight and I think that you need to keep that in mind as you figure out your portfolio. Thank you very much.

Speaker 12: Yes ma'am, thank you.

Darren Bloomquist: My name is Darren Bloomquist and I am a rate payer of Loop Power District in the City of Power and Progress, Columbus, Nebraska, and a very proud old guy, just have to throw that out there. I appreciate the younger generation's view, I'm glad you're here.

One thing that I really want to point out was the talk about public power, and that's what's been left out here, is Nebraska is a public power state. Every investment that NPPD has made is on behalf of you. We took a state that was arid and called a desert less than a hundred years ago and turned it into a very rich state with very good crop and livestock production. One of the main key inputs on that was reliable, affordable electricity. We need to maintain that.

NPPD has invested and maintain and own some of the best producing energy facilities in the nation. Gerald Gentlemen coal plant in Sutherland is the lowest cost, or one of the lowest cost, coal units in the nation and perhaps the world, and they burn the cleanest coal on the planet, which is the Powder River Basin. We have to have that source there to maintain the reliability and the affordability we need to

maintain this lifestyle, to have proper land values, to have prosperity to pass on to our heirs and make sure that they have something to grow from.

I appreciate the views expressed here tonight; I really do. I really appreciate the board of directors from NPPD that took the time to come up here and listen to their customers, and for the gentlemen on the panel, I truly appreciate that, but we need to really think about what we're going forward in public power. There are no shares paid to shareholders, the stockholders, in public power, none. It's only reflected in lower rates and reliability.

Conversely, wind contracts to renewable companies are paid profits to shareholders in states like Florida, New York, California. Yes, Nebraska does have a good resource of wind and there should be a percentage of that maintained in the portfolio, but we also have some of the best facilities and some of the best employees, NPPD has 2,000 employees. Talk about good paying jobs and paying taxes, those folks pay their share and then some, and are involved in the communities and involved in the school districts and city councils. Their jobs are important, they do a very important job, and I, for one, appreciate that. I would just like to thank everybody. It's 9:00, we all want to get home. Thank you very much.

Speaker 12: Thank you.

Doug Nelson: Thank you. Doug Nelson, Wayne, Nebraska. I've never seen a cashflow on wind turbines that accounts for the tax credits for subsidies, never. Without them, those things wouldn't exist. John Hayes, Nebraska state extension agent, made a presentation in Wayne while back. He said that there's a 30% treasury grant involved with a wind farm, for instance. Using his numbers, I put together a hypothetical cashflow. Let's build a \$500-million wind farm. We'll get our 30% treasury grant and subtract 150 million from that cost. That brings our depreciable costs down to 350 million. If someone asks you what the wind farm costs, you tell them 350 million. To the taxpayer, it's 500 million. It's really hard to get good numbers when you're talking about wind turbines.

Now, the next step is a possible 30% investment tax credit. Let's just take that and pull another 150 million off of that thing. That brings our costs down to 200 million. Now, a year has passed, we're in the 50% tax bracket and high-income investors invest in these things because they can fully depreciate their depreciable costs, that 350 million. They can do that one year. That saves them half of that in taxes if they're in the 50% tax bracket, that's 175 million of tax savings to subtract from your \$200 million cost basis at this time. That means you've got to go to the bank and borrow 25 million to build a \$500-million wind farm. Okay?

That's not all. The 2.3 cent production tax credit represents a 307% price subsidy to a man in the 50% tax bracket, if you assume a 1.5 cent a kilowatt hour wholesale price. The reason is, a tax credit is the same as tax-free income. You do not get a W2 when you receive a tax credit, it's tax-free income. Not only that, you can use that tax credit to pay a non-deductible expense. Now, isn't that sweet?

Now, the 1.5 cents wholesale price is a taxable number. The 2.3 cent production tax credit is not. To calculate the subsidy, you must have like numbers. The taxable version of 2.3 cents to a man in the 50% tax bracket is 4.6 cents. You see? If he loses half of that in taxes, he's got his 2.3 left. If you take the taxable version of a 2.3 cent tax credit is 4.6 and divide that by the wholesale market, 1.5 cents, you have created a 307% price subsidy for wind turbines, renewable energy. That's why they're building wind farms.

Speaker 15: [inaudible 02:59:53].

Speaker 16: Okay, so we're at 9:10. I want to thank you all for being here tonight and for your comments and feedback, it's really useful to our board. We started this night talking some about our diverse generation mix. That's a very important way we serve all of you, our customers. As we look to the future, that diverse resource mix will continue to be important and it'll include all the things we talked about tonight. Again, thanks you, and one last plug for the survey, wherever that is, online, [www.nppd.com](http://www.nppd.com). Go fill it out. Have a good evening, and again, thanks for coming.

PART 6 OF 6 ENDS [03:00:30]

## 3.2 Seward

Tim Arlt: We're going to go ahead and get started, so if you would take a seat, we'll get going.

So good evening on behalf of NPPD board of directors, management and staff. Welcome. We certainly appreciate all of you taking time out of your busy schedules to attend this public outreach meeting and forum, and engage in it because we're really interested in comments and feedback from you, our customers.

My name is Tim Arlt, I'm the Vice President of Corporate Strategy and Innovation at NPPD.

Just a few things before we get started. First, safety. If the fire alarms go off while we're here, there's an exit here and an exit back there. We should muster in the parking lots, if the fire alarms go off.

If a tornado siren sounds, we're asked to go down to the lower level of this building and stay there.

There is an AED in the hallway by the restrooms if we need that. And then if we do need that, I'd ask Jen Butler-Palu to call 9-1-1, to get 9-1-1 en route.

So, some quick facts about NPPD, the structure of tonight's meeting, et cetera. And then we'll continue on. NPPD is Nebraska's largest generation and transmission facility, we are utility. We are also a political subdivision of the state of Nebraska. Our operating revenues are approximately \$1.2 billion a year. We have 31 generation facilities located throughout the state generating 3,600 megawatts of electricity. So, to give you some scale, the Community of Seward that we're sitting in today peaks at about 35 megawatts. So, 10 times that amount, a hundred times that amount we are producing. We own and operate over 7,800 miles of transmission lines, serving parts of 86 of the 93 counties in the state. We roughly employ 1900 employees located throughout the entire state.

We provide power at wholesale and retail to 403 of Nebraska's 530 communities. We work in partnership with other utilities like Norris Power District, or the city of Seward to serve more than 600,000 Nebraskans. We are governed locally by an 11 member publicly elected board of directors. Our mission is to safely generate and deliver reliable, low cost, sustainable energy and related services while providing outstanding customer service. Based on 2022 proposed rate schedule, our wholesale customers will

experience no base rate increase for the fifth consecutive year. And our retail division will experience no base rate increase for the ninth consecutive year. Public power in Nebraska provides rates that are competitive and low nationally. Nebraska's residential rate is ranked eighth lowest in the nation. According to the latest energy information administration information. This is the national repository for rates. NPPD residential rates are below the state average. NPBD strives to power our local communities and economies by finding innovative and practical solutions to environmental, social, and community needs. We are not-for-profit, controlled locally and focused on our customers. We do not exist without our customers.

So why are we here tonight? What's the purpose? It's to start the conversation and get input from the public, on the value of public power, NPPD's current, and future generation mix, and the state of de-carbonization as we prepare our next integrated resource plan, which is due in the spring of 2023. NPPD's board continues to move forward with the development of a sustainable carbon emission reduction, strategic directive, that will include carbon reduction goals for the district. NPPD is committed to seeking and receiving customer feedback as a not-for-profit public entity of the state, which is governed by local constituents. We aim to operate in a transparent and open communication at all times.

This is the second of five public forums we are conducting throughout the state. We began last night in Norfolk, where we had a turnout very similar to this. So, the beta version goes on tonight. Conversation tonight will be specifically centered around the risk of being a carbon emitting utility. How NPPD's carbon reduction goals should be structured? What principles, reliability, resiliency, affordability, our environmental impact are most important to maintain as NPPD works to reduce its carbon emissions. So, the goals and expectations for tonight, these are very complex topics. Our goal is to give you a good general understanding of them, so you can provide us informed, valuable feedback. We would ask that you try to hold questions till after the presentations to ensure we get through the material. So please take what you learned tonight and apply it to the survey that we have posted at [nppd.com](http://nppd.com), or at your local wholesale partner website.

So, the meeting agenda pretty straightforward. Here, we have speakers from the Electric Power Research Institute, or EPRI. They will provide a background on the topics of discussion. The slides will be available on [nppd.com](http://nppd.com) for your use. We will conduct live polling throughout the night to gather and collect feedback. NPPD president and CEO, Tom Kent will speak on the discussion draft of our carbon emissions goal. And there will be plenty of time throughout the evening for you to provide feedback and questions to us. Do want to let you know these sessions are being recorded, so we can collect your feedback and analyze it, at a later time. Brad Kitchens will be our moderator tonight. Brad is the CEO of ScottMadden, and he has over 30 years experience in energy management consulting activities.

We do have some ground rules. One, to provide comments, we ask that you walk up to a microphone located in the room, provide your name, city state you reside in, and who your electrical provider is, and any other affiliations you might have. Comments should be concise, our moderator may limit the time of comments, if necessary, so we can hear from all of the people who care to speak. Please stay on topic, this really isn't a debate about climate science. This is really about de-carbonization of NPPD facilities, nor is it a platform to discuss any issues you have with NPPD. We have other mechanisms and platforms to address those. Comments should be civil, please respect one another's opinion and refrain from debating with others.

You'll be hearing from Tom Kent a little later. We do have three NPPD board members present tonight, Mary Harding, Gary Thompson, and Wayne Williams in the back of the room. We also have Senator Bostelman here with us tonight. And at this time, I'd invite Mary Harding up to provide a welcome from NPPD's board.

Mary Harding: Good evening, everybody. Tim did such a great job covering the waterfront with his welcome, that there's really very little else for me to say. Beyond, thank you so much for coming tonight. My name is Mary Harding, this is my district. I serve subdivision one, which is all of Seward County, and parts of Lancaster, Cass and Sarpy County. I'm also serving as Chair of the Board this year, but I also, as Tim said, we know how very busy you are, and input from the public to me is incredibly important.

So thank you for making time to be with us. We've got some big decisions ahead of us and we're going to take all the input we get and weight it very carefully. So, I think the two board members who are here, Director Thompson from Clatonia, and Director Williams at the back from Central City need a little bit of credit. Director Thompson is chairing the Strategic Planning Committee this year that help produce what we're working on now. And director Williams is one of the members of the committee. So, I want to thank them. That's all I've got Tim. Thank you.

Tim Arlt: Thank you, Mary. At this time, I'd like to turn it over to Brad to conduct the meeting. Brad, it's all yours.

Brad Kitchens: Thank you, Tim. Well, good evening, and welcome. Let me also, along with Mary and Tim, welcome everybody here tonight. First of all, it must be a real commitment on everybody's part to get here, just because its hard place to find. I've walked every corner of this campus, trying to find this building, and finally found my way. So, either you know the campus better than I do, or you're equally committed. So, we appreciate that. Tim provided a really useful, and helpful backdrop to what we're trying to do today. I will say this, the focus of this conversation of course, is de-carbonization and the pros and cons related to that. We want to hear from you, I'll tell you, I spend a lot of time with a lot of utilities throughout the country and this very, very important issue that your board and the leadership team at NPPD are wrestling with, is the same issue that every utility is wrestling with.

And so, we'll share some perspectives of how others are viewing this issue, but I just want you to know this is an important issue, probably nothing's more important for the future of the utility, not the future of the industry, but the direction of the industry, this is a huge topic. And again, your input is enormously important to the board and to the leadership, as they think through the strategic direction of NPPD. You do have two bites at the apple, just as Tim said. So, we want to hear from you tonight, and just to re-emphasize that the survey that's available [nppd.com](http://nppd.com). It's a terrific survey, first of all, it takes about five or 10 minutes, the same sets, sorts of issues that you're going to hear us talk about tonight. But after each question, it provides some information on that question.

So, you kind of answered the question, then it tells you a little bit about why does this matter, and what are the trends, and what are the key issues and challenges. So, I encourage you to take it and I encourage you to get your friends and neighbors to also take, that'll be very useful to all of you, and certainly very useful to NPPD.

So as the agenda, as Tim described, we're going to hear from our two industry experts from EPRI, for about an hour. And then we're going to engage in some Q&A for about 30 minutes. We have a little bit of polling in there, which we're going to test here in just a moment. And then we'll take a short break. And then Tom Kent will come up, CEO of NPPD, share the vision and view as it exists today, from the board and the leadership on what the thoughts are around this important topic of de-carbonization. And then we'll take again as much time as we need on Q&A, and really to hear your thoughts. We do need to end at nine, so I'll just put that out there as a marker, three hours should be ample time. As Tim said, we had a terrific evening last night at Norfolk, we had a similar size crowd, a lot of really good feedback. It went all the way up to nine o'clock. So, we hope we have similar feedback this evening.

So polling, let me show you, we're going to do a little test here because it's really important that we have several polling questions throughout, and there's two different ways of engaging in this poll. So let me focus your attention first to the left-hand side, which is the preferred method. If you have a smartphone, if you can just get on pollev.com, and get into that site, it'll ask for a username, and if you can just put in NPPD999, it'll ask for your information, just hit skip, you're in. And so, all these polls that come up over the next hour and a half or so, you'll be able to engage easily in those polls.

If you prefer to text, you can do that as well. You don't have quite as much visibility into the poll. You'll have to watch the screen, but if you prefer to text, the number, just like your normal phone number is going to be 22333, and then your text message would be NPPD999, that will open up the poll. So, I encourage you to do the first one if you're able, but if you prefer texting, that's available to you as well.

For NPPD folks in the room, we'd prefer that you not engage in this poll, and we want this to be just the public so that we understand their results and not NPPD results. So please, if you would stand down. I think that completes my introductory remarks. Let me ask you a really quick question, again, not for NPPD folks, but for others. If you had to categorize yourself as to one of two categories, one is, I feel like I'm a pretty engaged, pretty knowledgeable, pretty informed person about how the electric power system works. I understand the pros and cons and trade-offs, I understand it well, or I don't, I'm pretty much a novice, I'm new, I'm curious. I want to know, I want to learn, I want to engage, but I don't really know that much about the system. How many would put yourself in the first category? Pretty sophisticated user and knowledgeable about the system.

So just by contrast, quite a few hands, by contrast, how many would consider yourselves certainly curious and interested, but maybe not super knowledgeable, not quite the equal number, but close. So, for the first category, let me just ask for your patients. These first two conversations are really going to be trying to provide some equal footing, or for everybody on how the power system works. So, these two gentlemen from EPRI are going to talk about how the system works and then begin to talk about why is de-carbonization a big deal. And then again, we'll do some polling, we'll do Q&A. We'll hear from Tom, we'll do Q&A, lots of engagement on this important topic. So, with that, let me introduce the first speaker. We have two topics.

speaker 4: [inaudible 00:16:34]

Brad Kitchens: I'm sorry?

speaker 4: [inaudible 00:16:36]

Brad Kitchens: Oh, I'm sorry. I screwed up last night, the polling multiple times, I'm going to continue that trend tonight. This is our first test poll. So, we, either, again, whether you're on the website, or texting, of the topics presented, what is the topic you are most interested to hear about? You can only select one. A, I want to understand the risks associated with being a carbon emitting utility. B, I really want to understand what NPPD's carbon reduction goal should be, or C, I'd like to understand the trade-offs. You're going to hear a lot about C, just so you know, the trade-offs are costs, or affordability versus reliability versus environmental impact. So, if you had to select one of those that you really, really came here to hear about, which one would it be?

If anybody's wanting to engage with the poll and is having a difficult time, you might want to raise your hand. We've got lots of folks here that can come and help you. These gentlemen, we only have 22. You can see 23 in the lower right-hand corner, I'm guessing we should probably, if most of you are trying, I'm guessing we should be seeing 35 or 40.

Speaker 1: [inaudible 00:17:50]

Brad Kitchens: Yeah. Any other folks want to engage with the poll, and unable?

I see a hand here. Can somebody get this gentleman just... Sorry, sir. You've got Tom helping you. Good luck with that.

speaker 6: Got it.

Speaker 2: Mm-hmm (affirmative).

Brad Kitchens: 27, let's give it another minute. Just again, I want this to be available for folks and then we'll start rolling.

Comrade, we have another hand right over here.

All right. 28. I'm going to give 30 more seconds. I forgot the question. So, on that note, what topic is the most interest to you? We can go ahead and show the results, we have 30, we'll call that good.

So, you're most interested, first of all, pretty interesting, and reasonably equal distribution, but the NPPD's carbon reduction goal, and what it should be. And I'm sure why they're thinking those in those terms, I believe last night, and I won't get this right in all cases, I think the third one got the most votes last night. And again, the third one, if I didn't set that up, you're going to hear a lot about the trade-off.

When you think about generation portfolio of the future, you want to accomplish all these things, right? You want it to be affordable and low cost. You certainly want it to be reliable, you'll hear resilient as well, which I'm going to put it in the same bucket as reliable, and you want to make sure it manages very well, environmental impacts. So, you'll hear a lot about that, number three. You'll certainly hear number two from Tom, here in a little bit. So, I think we'll check all these boxes as the evening goes along.

So, with that, let me introduce our two speakers. So, I keep this rolling. The first topic is entitled priorities of the electric system, Dr. Tom Reddoch, both of these gentlemen are from EPRI. He's the Technical Executive at EPRI, for Power Delivery and Utilization, focuses often on things like energy efficiency, demand-response, EVs, electric transportation, and electrification. You won't hear about all those tonight, but those are areas of expertise for him. He also has spent the last seven years supporting the Department of Energy in its development of new next generation of electric power engineers, so very involved with the DOE. He was a former professor of Electrical Engineering at the University of Tennessee. And again, his topic is going to be around the priorities of the electric system. So, with that, Dr. Reddoch, I'll let you take it. Thank you for joining us.

Dr. Tom Reddoch: I guess maybe I should take this off. Is the mic, is it good? It has a strange sound so... Thanks for the intro and looking forward to our conversation that we're going to have again this evening, as we had last evening. And I'd like to encourage participation and, there will be an opportunity certainly for you to ask questions, and I really encourage you to do that. My associate and I, Billy Hall to my right, over the course of the next nominal hour. We're going to try to lay down some fundamentals about understanding how electrical system work and understanding the role that carbon plays in that, overall.

First of all, let me introduce our organization, Electric Power Research Institute. Many of you may not know of us. We were born out of the blackout in 1968. As an organization, we were put together, and actually in 1972, and we're all about advancing technology to aid the process of the electric system, how you engage it and how it performs, and our mission is pretty clear, and you're going to hear about this many times tonight.

We judge this, with three or four key criteria. One is reliability. One, is it affordable? How does it impact the environment? And there's another item that's more recently added to the picture, we call that resiliency. It's related to reliability. It's about recovering, if you have an issue. I didn't mention this last night, I wanted to be sure that I emphasize it. We do all of this in the notion of doing it safely. And in addition to that, it's all about you. I say it's all about you because this process is put together so that, as a consumer, you can access electricity to do many of the things that you would like to do.

A little bit about who we are, and how we operate as an organization, we are a 501(c)(3) non-profit organization, to serve the public. And so, this forum is ideal in the sense of what we try to do. We try to bring facts and figures, we're not advocates. Our view is the numbers will stand in their own right. And that's the message that we really try to convey. We carry out our mission in a collaborative fashion, and that's really what the expectation is tonight. By being with all of you, you have this opportunity to put your perspective on the table, and that's how the collaborative process works. It is by the sharing of ideas and then the selection of priorities and processes about how one goes about doing business. We keep our basis all about the science and engineering and the economics that come along with the transactions, and then how, not just technology, but also regulations have a big impact on how outcomes might manifest themselves.

So, this combination is really very, very critical. We have a number of themes that we focus on at the Institute. I want to point out a couple of these. With so much of the change that we see before us, and this is certainly an industry, the electrical industry is one that's undergoing a lot of change, is that historically the system was built in a very rigid fashion. And what we would do is that we would build

supply and delivery machinery to follow the growth, or the character, or the electric load, and that was our primary design practice. We're moving into an era when rigidity is not the way to do business. We're moving into an era where flexibility becomes crucial. So many of the new assets that we're looking at, like renewable resources, to be able to fully incorporate these into the system, what we need to do is have this flexibility component.

Also, you will see, and some of you may have actually participated in programs. We can also change the character of the electricity load itself. Things like demand response, or maybe energy storage in some form, or fashion. These are all ways of altering how the pattern of electricity is used. This is really key. The second item is that, historically reliability has been the cornerstone of why people like to use electricity as its energy source. And this issue of reliability remains premium. And it will be a key part of our dialogue tonight, as we talk about various options and the role that carbon plays in this delicate balance of how we put these processes together is a major driver in terms of what our future choices may turn out to be. The Institute is actively involved in a very large initiative called Low-Carbon Resource Research Area. And it's all about looking at resources that we can utilize that carbon is not a part of the mix.

And among those, a little more esoteric, but leading options is hydrogen energy, and that's a part that will be also, and I'd be remiss, if I didn't at least mention the extreme. And that is, we're very much about education, and very much about information in terms of explaining how things are. And so, that's a key part of our dialogue tonight.

So let me start digging just a little deeper into how things might come together. We're following a principle that we call the Integrated Energy Network. And this process is, how do we take the family of options? Whether they are power producing, or whether they are managing how we consume electricity, or what processes we elect to power with electricity? As opposed to something else. And we're looking, how do we bring all this together? And we're doing it at a time when the impact of computers, or let's say digital technology in general is right in the mix.

You may have heard the term smart grid, may have seen that in the press or discussed. The essence of smart grid is really taking intelligence and mixing it with the power producing, and power delivering assets, and making a work as a family. This is the broad principle of this notion of the Integrated Energy Network. What I'd like to point out, and this is really what you represent, is if you look in this diagram, what is it that's in the middle? It's you, the consumer.

So, everything about this process is all about ensuring that you have access to electricity. And our overall goal is that it'd be priced right, it has minimal impact on the environment. It's something that is reliable, and it's something that can recover if it has a problem. And there is not a process that humans put together that doesn't have an opportunity to fail, it's always there. So how we'll recover from it, is really most important. So, this concept really is an underpinning effort that we would like to reinforce as we go on with our conversation.

This is just pointing out, kind of reemphasizing, the consumer at the center of this is what it's all about. Having flexible resources, being able to use smarts.

So as increase the storyline, let's talk a little bit about our history about how did we get to where we are. And it's kind of, some clues about where we might get to, as we move into the future. If you know much

about the topic of electricity, most people know the name, Thomas Edison, and that emerged because he was the fellow who invented the light, that really sent the growth of the electric industry.

There was a special property about his light, though. It was powered by direct current. That means that it's like what you get from a battery. It's a flat line of production. The problem with building a system on DC is that you cannot ship the power very far. So, the transmission lines and things that you see today are born out of his leading competitor, which was a fellow named Tesla. You probably recognize the Tesla name, that's what it has been adopted by the electric vehicle that's probably most prominently known today. And Mr. Tesla actually offered a process for creating alternating current, which means rather than this being a flat line, it's something that varies with the frequency.

But the interesting part is that we never see that variation. It's all about being embedded in process. And there was this, I will use the term, there was this war between Mr. Edison and Mr. Tesla. And Mr. Tesla was the winner. And he was the winner because he solved the problem about how you can ship electricity over a distance. And what's the value of that? That means that areas can share, and generally by sharing, you improve the reliability and you'll lower the cost.

And there was a device that enabled alternating Current power to be effective. It was the transformer. And the reason being is it, when you ship it, which you could do is that you could elevate the voltage, which is the equivalent of pressure in a water system, and be able to push it long distances with a minimum losses. So, AC became the way of the future. And that's really what we have largely in the system today. This is kind of a continuation of a couple of significant milestones, is that it was really in the early thirties when we started to really look at electricity as an energy form, that would be most flexible and useful. The Federal Government, the first Federal Power Act, which was to focus on interchange of power at the interstate level. And that engagement really changed how we could share assets, because they could be shared over a much larger area.

The other thing I would've liked to point out over here is that, as we zoom through the thirties, forties and fifties, electrification really caught on. And major growth during the seventies, and what you might note on this chart, NPPD was originated in 1970. That's a very notable fact. The other item I want to point out here is this item just below that, PURPA, that stands for the Public Utilities Regulatory Policy Act. It's a mouthful. And basically, what that says is that if you own a power source, it guarantees you a market. So, if you put solar on your roof, you're able to engage the process. And this regulation actually opened that doorway. And with the recent advent in the lowering of cost of solar, it has really become frequently a choice by many consumers to put that on their homes. So that, that item is key to that effort.

So, let's talk a little bit about the electricity process just to make sure that we're all on a common page. And this is a simple diagram that illustrates it. As I indicated last night, I'll like to go to the end of this bus here, I'd like to start with number six. And that's because that's what it's all about, and that really is what represents you. Six is about the process of consuming electricity. And we were put this system together in such a way that, your expectation, that when you reach for the switch, you expect the lights to come home. And what we've done is that we've built a process whereby, that indeed does.

PART 1 OF 5 ENDS [00:35:04]

Dr. Tom Reddoch: And what we've done is that we built a process whereby that indeed does occur. And there are several steps in that. One is that you have to produce it. In a little bit, we'll talk about how you produce electricity. There are a variety of options. Also in the shared principle, we use what we call the transmission network. As some people say, it's the big structures with the big wires that you see. You see this more commonly when you're around highways, along interstates, along other major roads. And this is the big pipe network where we transport large amounts. And what do we do? We step the voltage up very high, lower the current. It lets us move it without a lot of losses.

And just as we come out of the power station and step it up, once we get to in delivery points, we step it back down, which is in step four. That's to get it to lower voltages, so it can be introduced into the distribution system, which then brings it directly to our homes and businesses in order to be able to use it. That's the overall practice.

Let's look at a couple of these things, just a little more closely. This is an example of the principle ways that we generate electricity, certainly today. And I like to divide this into a couple of categories. Take the fuel and go directly to electricity or take the fuel, burn it, or consume it in some way and go through an intermediate type of source.

So, let's talk about the direct producers. It makes it a little easier to think about. So, with wind, we have turbine with blades and it turns, and it gives me the torque to be able to run a generator. In the case of solar, we have a material that takes sunlight directly. And the result of that, it produces electricity. And hydroelectric, what it does, is we have water passing over a wheel. We've been doing this for a long time. Originally those efforts didn't generate electricity, they perhaps ground meal in some form or fashion. So, it's the fact that you take the fuel and then you directly get to an electric product. In a case of a hydro plant, it literally turns a wheel, that turns a generator, to produce.

Now we have these other sources here, like natural gas, nuclear, and coal. They all go through an intermediate stage. They first make steam and then the steam is used to drive a steam turbine that turns a generator to produce electricity. So, it's two different ways of getting the end product. There are natural gas facilities that actually produce directly. We normally think about those as a gas turbine that takes fuel in and directly drives a shaft. So, these are the different ways we make it.

Also, if you look up here in detail, every one of these power plants, whether it's NPPD or wherever it is, they all have a name. They're in your neighborhood, or they're in the region where you live. And what we've tried to do here is give you some examples of where some of those facilities exist in your area.

So, let's talk a little bit about that transmission. Remember, this is where we got the big wires, and this is where we moved the big volumes. And these connecting paths really a layer allows us to improve reliability and boost our economics.

The substations, again, that's where we either step it down or step it up. Step it up to get into the transmission system, step it down to get to distribution points of where we can use it.

This diagram shows a lot of these nice towers. As I was driving this way, in this area, some of your structures are shaped differently, so that's just something of a particular note. What you see most of is

the distribution system. Smaller poles and smaller wires in general. So, it's the way we get things to active use.

So, we're trying to put together this electric system that has two major pieces. On the left, in this diagram, what you see are really all those larger power stations that are producing electricity. They're pushed into the transmission network. And then when you get to the right side of this diagram, this is where we step it down for use. And the right side of the diagram is not just about use, but in our going forward strategy, we also see smaller power producing devices. Examples, solar on the roof. And these items are mixed together.

Also, on the right-hand side, we have extensive use of modern smart technology that actually manages how and when these things are brought together. And our goal, our goal is to put all of these together.

The other important thing to recognize is that you're not in this alone. NPPD is part of something we refer to as a Power Pool. And that is, there are several of these pools scattered around the country. And what this does is it's a reliability and an economic enhancing strategy. And that is the fact that you get access to things beyond your immediate space. And that sharing is been one of the key aspects that has made electricity such a useful part of our ability to take energy and put it into best play. It covers the Southwest Power Pool. You can see from this diagram all the way from North Dakota, down even into parts of Texas. So, it covers a very large area, but it's something that you have as a shared resource.

So, as we head towards closure, I want to pick up, really, this is where the EPRI mission kind of left off, but I want to really instill a thought in your head. And we're going to keep revisiting this through the course of the evening. And that is, we have these four things that we're going to be trading off, affordability, sustainability, and that as it relates to the environment, resilience and reliability. And the part I want to really underscore is that they're all connected. You impact one, you change one, you impact the others. And this combination is something that we have to keep in mind.

And I think the message that I would like to say is the following, the relationship between these four. If I do something that I spend more money, then the cost that you're going to pay for the product will go up. If I make an effort to make something more reliable, that may also influence cost.

So, these items are coupled. There are two drivers that influence how that balance takes place. One is technology. Advancing technology changes that relationship. And the second item is regulation. Regulations will change the balance. So those two in combination determine which of these make best choice, as we go along the way. And those relationships will change. And the outcome today may be very different than the outcome tomorrow.

So, when you're planning an electric system, you have to keep all of this in mind. So, your choices put you in a position where you're trying to create a plan that's flexible enough to recognize these changes will actually alter the relationship.

So here to kind of close out the thoughts, I want to talk just a little bit about how your electricity price, your rate is what you would think might be influenced. In the investor-owned utility community, we talk about the regulatory [PAC 00:44:17]. So, one of the things, the essence of the regulatory is to produce stable prices. That is avoid volatility in what you might be paying for electricity. And the deal essentially

that was struck, was that utilities would have regulations about how prices would be set, but they had the responsibility that they must serve all customers. They will have the ability to recover those costs and that impact will be reflected back through rates.

So, I always like to use the analogy of gasoline. Gasoline is a great example of how, when you don't regulate, you have a lot of volatility in prices. The electric industry has tried to avoid that and stabilizing prices does let you use a resource more effectively. And with that, I look forward, as we go through our discussion this evening.

Brad Kitchens: Dr. Reddick, thank you.

Dr. Tom Reddoch: Thanks Brad.

Brad Kitchens: Let's see. We're going to do a couple more polling questions. So, this is the first one, following up on some of what Dr. Reddick had to say, this one, you can actually rank one, two, three. So, if you're in the poll ED, there's a little arrow to the left side of each one of these. You can move it up and down. So, what we're interested in, when you look at those three elements that we're going to be talking about, we have to kind of balance, I'm sure some of you would prioritize one over another. So, if you had to rank these one, two and three, how would you rank those three very important factors?

And again, if you just touch on any of those bars, you'll see a little up down arrow on the left. You can move it up and down and get the three squares where you want them. It's 27. Give you another 30 seconds. Oh, we're over 30. Why don't we go ahead and let's see what we got.

So, in order, reliability, resiliency. Same thing last night, by far, the number one item on... and when we heard comments, the number one item. Last night, interestingly, affordability and cost were number two. Tonight, it's around environmental impacts and affordability and costs are number three. Again, we'll talk a lot about all three of these. We'll talk about you can't emphasize exclusively one over another, but you have to have some notion of prioritization and this is what this group thinks. So, thank you for that.

One other polling question. So, we're going to do a little word cloud. We're going to talk about this, but before we get into it, when you hear the word, decarbonization, what's one word that comes to mind? If you had to type in one word, when you hear decarb, you think don't get it, or confused or like it. What's something that just immediately comes to mind when you hear decarbonization? Keep asking for one word and throwing out there phrases that got eight words in them. My examples aren't real good.

Okay. Wow. We're up to 39, 40.

Speaker 3: They're getting the hang of it.

Brad Kitchens: Yeah, I guess we got some new engagement or the NPPD folks are weighing in. 47. Good deal. Let's see what we have. 48.

So, the size of the words here, when we see it in a minute, correlates with the number of votes. So clearly, overwhelmingly, the number one vote out of the 48 that responded was good. It looks like unequivocal, innovation, expensive, maybe imperative would have been in the top five. So, some really good words up

there. Hope, sustainability. You see some unnecessary, essential. So, I'm guessing we have a few different points of view, but you can see at least from the word cloud that innovative, good and some of those suggests thoughts in terms of where the crowd's heads are. So, we'll hear more about those, I'm sure, when we get comments from each of you. So, thank you for that.

So, let's hear our second speaker. So, the first topic was just a general overview of how the power system works. Now we're going to begin to talk a little bit about business risks of carbon and decarbonization. So also, from EPRI, Bill Howe's going to be presenting this topic. Bill is the program manager for EPRI, for power quality research. He primarily oversees strategic planning and a variety of multi-client studies, covering quality, reliability, productivity of the energy delivery system. He worked with several Fortune 500 companies as well, in his tenure and again, his topic is business risk and I know you're going to introduce a new word, but I won't steal your parade there on the title adjustment.

So, anyway, Bill, thank you and welcome. The floor is yours.

Bill Howe: Thanks Brad. Wrap up 20 after?

Brad Kitchens: Correct.

Bill Howe: Great. Thank you for this opportunity and it's a great forum. As was already mentioned, we had a great meeting yesterday and I actually learned a lot, which I love. Before I jump into the topic here, and we're here to talk about carbon decarbonization, I couldn't help but think, oh, my soda went flat. It decarbonized. Sorry. No one put that into the word cloud.

I feel like you can only really talk about risk, in a context and all of us are assessing risk for ourselves all the time. My wife always asks me to text when my plane lands and I occasionally will say, "Well, the most dangerous part of my trip is just beginning because I'm getting into my rental car and driving," but it's somehow, we associate more risk with planes.

The thing I wanted to talk about in terms of context... Tom gave a great overview of the electric power grid and how it basically works. The thought I want to give you at the onset is that the power grid has been characterized by a number of different authors and sources as the largest machine ever made by humankind. And not only is it the largest machine, in many respects, it's the most complicated, and I'll go into why that is, in a little bit more detail. But it's also been our largest machine for decades.

Most of the infrastructure that we've created was designed based on 1920s and 1930s technology. Some of that technology is still in service. We don't have another... The closest thing that I've come to, in thinking about a machine as big as the electric power grid, is now the internet. And I think, well, what is the internet run on? It runs on electricity. It runs on our classic machine.

The reason that I want to think about, and I'll come back to that theme, during the course of my presentation, is that when we think about risk, we need to think about it in the context of operating this machine. Not only is it huge, it's also essential. It's vital to everything that we do. It's also a right now technology. A right now machine. The power that's energizing these lights, is being generated at this instant and it's being generated by an increasingly complex array of different technologies. It's being conveyed to this building by an increasing complex grid.

And one of those things is part of the risk that we're trying to manage today, is that the grid in the 1930s, when it was first being put together, all of the energy, except for maybe the occasional windmill pumping water out of the ground, not generating electricity, all of the energy being produced was produced by the utility. And it was conveyed in one direction only, from generation transmission, through substations, through distribution and to all the myriad points of end use. It was a simple system, conceptually. Still very challenging to operate and very demanding to operate, but very, very simple in concept.

Today, so many of those elements have changed. And when we talk about carbon and de-carbonization, I just wanted to be in the context of that. That's part of what the utility has to balance.

One point I want to make is that, in my house, when I flip the light switch, I don't even think about all of that infrastructure. I just expect the lights to turn on. And 999 times out of 1,000 that's exactly what happens. And in fact, I'm two steps into the room, if the lights don't turn on before I realized, wait, what happened? That's my expectation is that it's always going to work. Electric utilities, particularly in the U.S., were so good at operating that amazing machine, that we believe, that we've come to believe collectively and I'm absolutely included, that it's easy. We've become so good at it that we don't understand or appreciate all the risk management the utility is doing.

The one other element I wanted to introduce coming back to risk is the utilities do that for us without us even knowing it. They're managing price volatility of all the different fuels. They're managing regulatory volatility, what's going to be changing. Carbon is part of that. They're managing weather volatility, which even more has come to the fore because if we're operating solar, we have to care about clouds. If we're operating wind turbines, we have to care about wind. The level of volatility that utility manages is only growing.

And the last thing I'll mention, we've talked about resiliency, at the same time that the utility's operating all of that, we also expect them to be able to respond to virtually any kind of emergency and get that system back up and running, regardless of how and why it breaks down.

When I listen to the radio or watch television or check the internet, I'm not hearing reports about how many people don't have water or how many people don't have trash pickup, or how many people don't have sewer, or how many people don't have gas. What do I hear? How many people are without power? That is our benchmark for how we're serving the community and that's what the electric utility is responsible for.

So, with that preamble, thank you for your patience. I want to keep coming back to that because I think to understand what's happening in utility industry, we need to understand the context that we're in.

So, we're really looking at a transformation of the electric utility industry, in many different ways. We're going to be talking a lot about energy supply. Now coal was the historic base fuel for the industry for many, many years. 50 years ago, all we cared about, collectively as a society, was the service that electric power provided. We just wanted electricity. We really didn't care collectively about the environmental impacts, about the economic impacts of the fuels that we used. We may have been aware. In fact, I found a 1958 documentary that talks about global warming. I don't want to talk about the science of that and

the politics. It's just, it's that old. The concept of putting CO<sub>2</sub>, it's just been around for that long. But we didn't care about it then. What we cared about was the service.

Today, we care about where our electricity comes from. We care about its environmental impact and that's part of what the utility has to manage. We're also looking at more and more integrated systems. So, I could describe the very, very simple kind of linear grid with power flowing only one way. Our grids were designed for that scenario, where you've got central generation going one way to well understood and used loads.

Now we get power in three phase powers, the three wires. You'll get power flowing in one direction on one wire and the other direction on the other two wires. Grids were never designed for that, but that's part of what we have to manage today. So integrated systems, being able to monitor that and to be able to understand it and regulate it and control it is extremely important.

Another major important variable, as I mentioned before, 50 years ago, all we wanted was the service. In fact, rural electrification was the big deal. Then when will I get power? Now, communities play a much more active role. One of the reasons we're here and evidence of that is today's meeting. So, concern and issues around the environment and increasing regulatory oversight, actions on the part of governments, on the part of regulators, on the part of communities, is increasingly important for the role that the utility plays in managing that. Which rolls up to the main topic that we're going to be trying to address in this presentation, the increasing role and focus on and scrutiny of carbon and carbon emissions.

So, energy supply is getting more complicated. If you just asked someone, what does the electric utility do, 10 or 20 years ago, you'd say they produce electric power and they provide that electric power to points of end use. That's their basic function. I've tried to add a lot of other nuances to that already in this presentation, but that would be the basics. The interesting thing about today, is that the utility is not necessarily the only energy creator. In fact, they're definitely not. Solar farms, wind farms, other generators are now participating in this role, much more actively. As a society, we're finding more and more ways and more and more installations to produce energy.

So, what is the fundamental remaining rule for the utility, unambiguous? Getting all of that energy to all of you in a form that's suitable for all the devices that you need to energize. That happens to be my special field of expertise, is power quality. Is it getting to you in a form that is suitable? The only machine that can do that is electric power grid and the utility that runs it.

So, let's talk about some specifics. Broad trends over the years have been going from almost half of the power being generated with coal to a significant reduction in coal use. These are nationwide for the U.S. A big part of that transition has been enabled by switching to another fossil fuel, natural gas. That was a natural transition. Natural gas per BTU output produces less than half the carbon of coal, and it produces none of the particulates and none of the heavy metals. It doesn't produce fly ash. It's relatively easy to move and store, and we've gotten much better in the U.S. in getting it out of the ground, with technologies like fracking. So, it was a natural transition.

I think in the context of this, natural gas will play an important role, but it's probably a transitory role to other technologies. Nuclear and hydro have been quite flat for obvious reasons. Lots of infrastructure and political impediments, for lack of a better word. Probably not technology ones, but they're complicated

technologies for us. Now, coincidentally, where we're seeing rapid growth are in the new technologies of wind and solar. Particularly in wind. And I know wind is a huge resource here in Nebraska, that you're now beginning to harvest, so to speak. So, we expect this trend certainly to continue.

The next two slides provide a kind of a pie chart view, kind of a before and after picture. So, in 2004, half of the electric power in the U.S. was generated coal. And there was a reason for that. We've got the coal right here. I think we've got the largest reserves in coal in the world. So, we've got the coal and we know how to mine it. We know coal technology. We know how to use it. We know how to burn it, but it has a probably deserved reputation for being a high pollution source of energy.

So, what have we done collectively? Coal is now less than half of what it was. We've already made huge progress, in terms of, if one measures progress by reducing coal consumption for electricity, huge progress has already been made, mostly driven by increased natural gas use. But the really stunning thing about these before and after pie charts for me, is we go from zero for solar and wind, 10% on aggregate today. That is a huge revolution.

If we think about how long we've had the electric grid and how long we've had coal, primarily as our energy base, to go, in less than two decades to 10% of a huge number in an alternative resource that didn't exist before, is I think a real harbinger of things to come. It actually shows the potential that even under difficult circumstances and working out the details, we're now poised probably for very, very rapid growth.

I wish we could somehow fast forward to what the 2034 pie would look like. I suspect we'd see solar and wind looking comparable to what nuclear and coal are today, at least, and probably closer to what natural gas looks like today.

Coming closer to home with NPPD, a very similar story to tell, of course with unique numbers. NPPD, 15 years ago, roughly, produced two thirds of its power with coal. I think most of the coal came from Wyoming. At least that's what I heard over and over yesterday. Next door neighbors. At least it doesn't have to come too far.

In the last 15 years, NPPD has already made a huge transition to lower carbon emitting fuels, based on all of the economic pressures, the regulatory pressures and reading of the tea leaves of what's to come. So, we're talking about risk management. That risk management effort has already been in place for a number of years and has manifested and already, NPPD making enormous progress toward moving toward a lower carbon footprint. Most noteworthy for me and this is the huge increase in wind. You're already beginning to harvest the natural resource that you've got here, in terms of steady winds through particular corridors in the state. And a little bit of solar with probably a lot more to come.

I was struck yesterday, there were a lot of farmers and I'm sure there's farmers here as well, a lot of the farmers, I would say most of them, had wind turbines. And it occurred to me that if you put in solar, you're not doing anything else with that piece of land. It's got solar on it. You can't put anything above it. You'd shade it. You can't do anything below it because it's shading. So, wind turbines may be a more symbiotic technology, when you're doing farming on the same ground.

I mentioned earlier about integrated systems. Part of the challenge to the modern utility is dealing with a massive increase in complexity. We're here to talk primarily about carbon, decarbonization, et cetera. That is just one of the variables that utilities are having to manage today. I, in the power quality area... So, if your lights flicker and your computers wig out, that's the stuff I care about. Or if the lights flicker and your irrigation system and you have to reset it, that's kind of stuff I care about.

What we are seeing, whenever you take a simple system, central generation, power flowing in one direction to well understood loads, and change it radically, you get a lot of unintended consequences. Integrating those systems and dealing with those unintended consequences is part of what the utility does.

So, what kinds of systems are we talking about? We're talking about widely distributed points of generation that are not centrally located, but are all over the place and connected, often at the very edge of the grid. Often, they feed back into the grid. You'll have parts of the grid where the net power is zero, but the amount of current going back and forth is very, very high. That's because part of the day, the power is flowing from the utility, classic utility. The other part of the day is flowing from distributed generation. That's a challenge in the level of complexity to manage.

How do we manage it? We do it with integration. We do it with data. We do it with communication systems. We do it by being able to reconfigure the grid, in response to upsets. We do it by monitoring the grid more aggressively, so that we can identify issues before they become expensive problems. That's part of the challenge of dealing with an integrated grid. The only entity that from my vantage that can deal with that, is the utility and most utilities that I see today are taking that challenge on quite aggressively.

The consumer is a big part of that increased complexity. A huge portion of the electric power use in the U.S. used to be motors that were directly connected to the system. So, they're rotating mass, high inertia. Most of the power was generated with huge rotating loads, high inertia. Today, almost all of our loads are electronic. And in the future, there'll probably be 100% electronic or connected through what we call inverters to the grid. In other words, they're not the classic loads. And every one of these lights is electronic.

Lighting used to be the classic best base load for the electric utility. The pure resistor. The Thomas Edison light bulb was wonderful because it was pure resistive load. Didn't produce any contamination, in terms of effecting voltage. Didn't produce any other frequencies, which we call harmonics. It was very, very stable load. It's all been replaced with electronic load today.

There's electronic loads in general are more challenging to the electric system to serve because they're not as simple and they are more sensitive to changes in electric power. So even as we want this machine, this incredible machine to keep running, we also want it to absorb all of this new complexity. We want it to improve in quality and reliability, and those demands are increasing, as we put more and more sensitive loads onto the grid.

And then the other aspect of this increased complexity is communication. The amount of communication between the utility, it used to be the only communication between the utility and the customer was when the customer picked up the phone and said, "My lights are out." That was it, unless you didn't pay the bill. They'd call you.

But I do have to say, I'm going to share one funny anecdote. This is probably 20 years ago and I saw a presentation. It was a very visionary presentation about how the future of the grid would look and how we could anticipate outages and everything would be online, et cetera. And at the end of the presentation, the presenter said, "Well, if anyone wants any more information, give me your card." And I thought, that's where we are today. "Give me your card," which is the old way of communicating, in the contrast of where we're going.

Dealing with that challenge, communicating with you better. Programmable thermostats that can respond to time of use pricing, is today and become a bigger role tomorrow. One of the things I learned about during this visit, which I was very pleased to hear, NPPD has an inspiring program, working, I suspect, with many of you, where they can turn off selectively, irrigation systems, just hopefully for a short period of time, and on a troublesome period of time, so they can reduce the amount of load on the system, which helps them manage the generation side.

If there's a hiccup in generation or a peak shaving need, working with you helps NPPD reduce its costs and it's probably one of the reasons why, NPPD has lower rates than it would have otherwise, and has low rates on a nationwide basis. The more we can work together within those aspects, by integrating technology and communication enables that capability. And with a little effort upfront, we save a lot of money down the road.

That's a great lead in to the dialogue that we're having now. The role of community in the operation of the local utility is massively increasing. This meeting is evidence of that.

PART 2 OF 5 ENDS [01:10:04]

Bill Howe: Having worked in power quality. I've visited many utilities over the years and every now and then I will hear, "Well, no one's complaining about the quality of the power, so it must be fine." That is going away. Because utilities are actively engaging in leading in, in terms of their engagement with their community, because we're all in it together and especially true with public power, which is what you primarily have here in Nebraska. So, when we're talking about carbon specifically, there's a number of different avenues. Probably the idea about carbon and impact on the environment of electric power really first started gaining traction around the idea of energy efficiency. Back in the mid 1990s, there was a lot of another element that utilities needed to manage was the expectation on the part of regulators that utilities would participate in energy efficiency.

It's called demand side management. The idea that you help people put in more efficient lights. I mean, the first CFL I ever got was a box of them from Xcel Energy. Of course, they all died within six months, but now they last much longer. And now we've got LED ones, which last even longer now. But the idea started with energy efficiency and the idea that utilities should play a role in that and have the dialogue with the consumer on that as well. Cleaner electricity is really a big part of what we're talking about today. We're talking about using less electricity or maybe using it more intelligently. I mean, I first became aware of energy efficiency when my parents started telling me, "Don't leave the lights on, turn the lights off. What do you think we are? Money grows on trees." That kind of thing.

"Turn the lights off when you don't use them", is all part of the ethos here. So cleaner electricity, use less of it, use it more intelligently, don't waste it. And what we do produce, produce it more cleanly. Carbon is now part of that equation in terms of what we think about with clean power. If we're producing better and if we're using it more efficiently and we're producing it more cleanly, maybe we have the opportunity to improve overall the environmental performance or economic performance by maybe electrifying some things that could be electrified. Can we use electricity that's been produced cleanly in more imaginative ways? Electric vehicles are a great example of that. And in fact, California is on a track toward 100% electric. We'll see how that goes, but the only way they can justify that is the assumption that they're using clean electricity to energize those vehicles.

And I'll come back to electric vehicles in a moment. The other is obviously low carbon resources, further advancing and cleaning the power and making it more environmentally friendly, if you will, and in response to regulatory pressures. And that's really the theme of what we're talking about here. So, talking about de-carbonization, I don't think we've actually defined it for you necessarily, but it's the ideas of reducing carbon emissions and things of that sort. There's three different ways generally, to think about it. One of the most common is 100% renewables. We're producing all our power with wind and all our power with solar. I had a call, a friend of mine asked me, what would it take for him to make his home 100% electric, off the grid electric. I need to make that clear, 100% off the grid.

And I said, "You don't want to do that". And he said, "Well, why not?" Said "That's third world power." That is third world power. If you've got 100% renewables without the grid, when the sun doesn't shine, you don't have power. When the wind doesn't blow, you don't have power. You also have to go through your house and reduce profoundly your energy footprint, because you don't want to buy panels to serve everything that you have today. You want super energy, efficient refrigeration, heating, lighting, everything else. And that would be the first thing that you would do. So, with the grid, 100% renewables, we have the opportunity to diversify. And so, there is perhaps the opportunity to think more about that, rather than on an individual basis. The other way to think about de-carbonization is what we call carbon free, or is called carbon free.

This adds to the classic renewable resources, which I guess I should have concluded hydro adds nuclear. So nuclear is a carbon free resource and a very important one, here in the state with your Cooper power station, a very, very important contributor to the economic growth and prosperity in Nebraska. So, with carbon free, we add in nuclear. For me, I think the most useful concept is net zero. We're all familiar with the 80/20 or 90/10 rules of thumb, that if you want to make progress in something, the first 80% or maybe 90% is relatively straightforward to accomplish. The last 10% can be gut wrenching. What that has acknowledged in the idea of net zero, is that we may still have some processes. We may still, for example, have a natural gas plant that's available during a crisis. Well, when we run that plant, we're producing carbon. But maybe we compensate for that carbon through other means. Through, whether it's planting trees or some other mechanism. It's actually, I think, a more useful concept from my standpoint. I'm not trying to sell you on it, but I think net zero is probably the practical path forward, if we're going to get to something that smacks at zero carbon.

We're talking about risk management for the utility. One thing that I want to emphasize, I don't want us to just think about carbon as a risk. It's also an opportunity. The companies that are producing carbon today, that do the best job of reducing their carbon footprint, better their position from a regulatory standpoint, better their position from a legal standpoint, are considered leaders in their industry and may

actually be able to participate in carbon markets, which I'll talk about, I believe in the next slide. So one of the issues that's coming to the fore is many, many countries and many, many companies are now factoring carbon and carbon management into their portfolios and into their requirements. So for any utility to remain competitive and to remain ahead of that, we need to manage it. It's part of the risk management profile that we need to take seriously.

It's also helpful if we act in aggregate together, kind of have an even playing field. Very, very difficult to do on the international stage, but the Paris Climate Agreement was an attempt to do that. And at least a start in trying to get everyone at the table, talking together. Carbon markets. So, one of the mechanisms to provide a financial incentive for all kinds of carbon producing enterprises to value or to put an economic value on it, is for the governments or regulators to assign an economic value or penalty, if you will, for producing carbon. Now, I learned recently, Tesla, the car manufacturer, entered profitability... I have three minutes. Entered profitability based on two unusual things. Wasn't selling cars. Does anyone know what those were?

First was Bitcoin. I don't think they're going to pull that off again, but the second is carbon credits. Tesla receives carbon credits because they're producing zero emission vehicles. They sell those carbon credits for about \$2 billion a year. So, what this illustrates for me, whether that's right or wrong, what it illustrates for me is the economic power of being on the right side of carbon management. Is that if you're on the wrong side of carbon management, you're paying a company like Tesla, hundreds of millions, or maybe billions of dollars to buy permits like that. If you're on the right side of it, maybe you can sell carbon permits yourself because you free up that bandwidth, and improve your economic performance. So, this is an example of the kinds of things that utilities have to deal with today. Is that if you don't improve your carbon footprint, you may very likely have to be in a position of buying expensive things like carbon permits. And that's something that has to be managed at the utility level.

This is a quick review of just how prevalent a focus on carbon management is becoming. 90% of Fortune 500 companies, increasing numbers of targets, increasing number of companies. You have a number of multinational companies that are either in Nebraska or interested in coming here. Guess what many of those are going to come with? What's your carbon plan? We want to be net zero, how are you going to help us? Getting ahead of that is part of what a NPPD is managing? So in wrapping up here, I think this is my next last slide. The content on the left is a repeat, obviously from a previous slide, but the key is we're here to talk about the future. So just summarizing, in fact, I'll jump to my last slide. NPPD is managing this incredibly complex and amazing machine that gets power and energy from all over the places to your points of end-use right now, and is managing all of these risks.

One of those risks, and I would say opportunities, is carbon emissions, fuel sources, et cetera. And they're here to ask your input on how they should go about doing that. So, thank you very much, for your attention.

Brad Kitchens: All right. Bill, thank you very much. Tom, thank you very much. All right. We're going to do two more polls, shocker, and then we're going to open it up and hear from you for a few minutes, but let's... So, based on what you've heard so far, what concerns you most about de-carbonization? The risk of doing nothing? The risk of not knowing how it will get there? Just the challenges and the unknowns of embarking on this journey, or you're just not really that concerned, not a big deal? So out of those three pretty simple choices, where would you lob your vote?

What'd we get last, 50? 50? Oh okay. There's 36. I think that's good. All right. Somewhat of a common theme with the word cloud. So, the risk of doing nothing is what would concern the majority in the room. Second would be, I'm not that concerned about de-carb, and then the risk of not knowing how to get there, is a pretty distant third. All right. One more question. In your opinion, has NPPD done enough to diversify its energy resource mix thus far? So, I think you saw the pie chart that Bill showed. So do you think, one we're being too ambitious, two, we're doing more than enough, but not too ambitious or about the right pace, not quite doing enough, but not too far behind. We're pretty far behind or I don't know.

All right. 37. I'm going to guess A or B. I'm sorry, D or F or D or E you will be the top. About the right pace. Excellent. Given the earlier ones, I guess I thought maybe we'd see a little bit more on the following two. So, the first is about the right pace. And I'll share you what the industry is undertaking right now in just a second. And then a fairly healthy dose of you think we're pretty far behind and then a smattering of the other ones. Just so you know, the industry overall, you saw that we've, not part of NPPD, but NPPD has reduced their carbon footprint about 45% since 2005, as an industry in 2007, just before the great recession, the industry overall emitted about 2500 million tons of CO2 in 2007. Of course, load came down through the recession and started to pick up after the recession.

A lot of these controls and emission standards and management efforts came in place. And now we're below 1500 million tons per year. So, about a 40% reduction as an industry, you saw NPPD is about a 45% reduction, so leading the industry. Another couple of, and by the way, and you probably know this, but transportation is now the number one CO2 emitter in the United States, by not a lot, but back in 2007, before that huge reduction that the utility sectors undertaken, it was number one, transportation was number two and other industry was number three. Now transportation is number one, which is why you hear a lot of chatter. One of the reasons around EV and, the Biden administration is looking at an executive order to have half the new cars in 2030 be EV. I think that's going to be quite a lift, but nonetheless, they're trying to focus on the transportation industry, just like we focused on the utility sector.

Two other quick factoids. You may find interesting on the growth that we've seen in solar and wind over the past few years, and I agree with Bill, it's been an enormous lift in a short period of time. Roughly in both cases, we have about 120,000 megawatts of solar capacity in the U.S and about 120,000 megawatts of wind capacity in the U.S, not exactly, but roughly. The predictions are by 2026, 5 years, each of those will double. So, they'll both be about 250 gigawatts or 250,000 megawatts. And the expectation is by 2035, they'll double again. So right now combined, it's about 120, 120, about 250, and it's expected by 2035, it could be as many as, a million megawatts of capacity of wind and solar. So that's the kind of growth that we're seeing as the hockey stick you always hear talked about with new technologies after a long, long period of maturation.

That's what we're starting to see with solar and wind. And again, it's proving out thus far. So, the outlook is bright, if you're fond of wind and solar. So just some interesting points. So, we're going to go to your thoughts, your questions, your comments for about 15 or 20 minutes. Then we'll take a break. Then we'll come back and hear from Tom about what NPPD and the board's thoughts are. And then again, we'll open it up to about 45 minutes of comments. Our request is, if you have any comments or questions that you come up to one of these two mikes, you provide your name, your city or location, and your power provider. And my other very, very strong request, my only modest criticism of last night. We had a couple folks that quite frankly, my word, just droned on. After about three minutes, ain't nobody listening. So,

try to keep your comments relatively sharp, relatively focused, relatively brief, because after a while you were just talking to yourself. But we want to hear from you. And, that was not instructed by NPPD to offer those comments. But I do think last night, and a couple of occasions, we went a little long. So, I just asked that we be respectful of the audience, be sharp with your thoughts. We want to hear them. And it looks like, sir, you're up. So, name, location, and power provider, please.

### 3.2.0 Public Comments

**Bill Bevins:** My name is Bill Bevins. I'm from Waverly, Nebraska, and we're served by Norris Public Power and LES. And I think this has been really good information, first of all. And I would just like to say that the one thing that I heard talked about and is, a priority concern is the cost. And I would just like to suggest that we're way beyond the time when we can look at costs as being a limiting factor for de-carbonization. At least when we're talking about dollars and cents costs, because the cost is piling up on our environment and we need to accelerate whatever we can do to lower the carbon input. I think the time for burning coal powered plants has long since passed and they just need to go away. So, I think that in general, Nebraskans are people that want to be part of the solution. So, I would just say, let's get busy.

**Brad Kitchens:** Thank you very much. We saw that in the polling results, reliability, environmental impacts, costs, third. So, I think your comments are held by others in the room. Yes, ma'am.

**Reverend Penny:** My name is Reverend Penny Greer. I guess I'll do this. I represent Nebraska Interfaith Power and Light. I am the president of the board. Lincoln Electric System is my utility company and Nebraska Interfaith Power and Light has been very committed to working closely with the leadership of Lincoln Electric System. I was asked to bring my PHEV to a show, which we just had in Lincoln showing off hybrid and PHEV vehicles. And a number of us, I had a number of conversations with our power procure to understand how the Southwest power pool actually works to require compensation, when you guys are putting together your mixes every day to buy power. Our organization worked very hard to convince a lot of people that LES needed to set a very ambitious goal. 100% net zero carbon by 2040. That's a big goal. And right now, as I've heard LES representatives talk about it in public spaces, there's going to have to be some new technology developing with battery, storage and other kinds of attributions that will enable this goal to be made and succeed at.

I'm a person who studies climate at the University of Nebraska. And we now know that the way that carbon dioxide works, is just as clear and indelible as the way electricity works. The presentations tonight have been excellent. CO<sub>2</sub>, absorbs long wave radiation from the earth. And the darker the earth becomes the more the ice and snow melt. The more CO<sub>2</sub> will hit those greenhouse gas molecules. They'll begin to vibrate. The temperature will increase and they will actually scatter energy. We know that that is what happens. It is happening again and again, in our atmosphere, we have to change. So regardless of the risks, regardless of how scary it might sound, regardless of how the technology doesn't seem immediately there to live out the goal, I strongly support you considering making the kind of goal that the Lincoln Electric System made. We absolutely need your leadership. And again, I thank you for this opportunity and for the excellent presentations that you've given tonight. Thank you.

**Brad Kitchens:** Thank you very much. That's very nice. Thank you. Thank you for that oversight. Well done. Oh, sorry. I didn't see you over there. Please.

Liam Downs: Hi, my name is Liam Downs and my electricity service provider is LES. I just wanted to emphasize that LES and NPPD do work together to provide electricity for customers. So, with LES's goal already set in place, I just think it's logical to line up with that goal. I wanted to also emphasize that if a liability is the issue that seems to be halting the progress, I just believe that that's more of SPPs job to provide NPPD with that imported power and worry about the transmission. So, I mean, if the wind is blowing in, somewhere else in the Midwest, I think we'll have electricity here because it'll just be imported. But I just wanted to emphasize that I do agree with the de-carbonization by at least 2050, and I think NPPD should as well.

Brad Kitchens: Thank you very much. Appreciate that. And please, Bill, Tom, if you have any comments at all, please weigh in. Yes, sir.

Kurt Otis: My name is Kurt Otis. I live in Rural Crete, served by Norris Public Power District. And full disclosure, I am a retiree of Nebraska Public Power. I just wanted to, I don't know if it's a comment or a question, but Bill had a slide on, what does de-carbonization look like? And it mentioned 100% renewables, carbon free and net zero. And Bill made the comment that net zero is probably the most likely goal to shoot for. And he also mentioned that, the first 80 or 90% of the cost to get there is fairly reasonable, but then that last 10 or 20%... You got to fixed? That last 10 or 20% becomes logarithmically higher until, the cost of getting to net zero is infinite. So, are we talking about net zero or are we talking about kind of net zero?

Brad Kitchens: Thank you for the....

Bill Howe: Hello? You raised a very important point. I thought I was holding it low enough. Let's do it that way. So I think the concept with net zero is that you have more of a portfolio approach. So, you do as much as you can with the other two approaches, which is, you've got your non-carbon producing generation renewables rapidly growing. Obviously, here in Nebraska, you've got your happily, you've kept your nuclear power plant and you've actually increased your use of it, which I think is probably helping as well. Both of those contribute to the net zero column, but with net zero, you bring in a whole other portfolio of other things that you can do. So the concept there is that it'll always be difficult to get that last 10 or 20%, but the more tools you to work with. So not to belabor the point, but if the only tools you've got are renewables, then you've got to get that through that last 10 or 20% trying to get the last bit of fossil generation off the grid.

Very, very challenging. With the middle approach, you may add nuclear, and that would be a big help. The problem is we can't build new nuclear plants in this country, at least not now, maybe eventually. Well with net zero, you can do innovative things like carbon credits, like planting trees, some innovative approaches, even like electric vehicles, can you help other industries reduce their carbon footprint? With electrification, for example. If you can take very carbon intensive processes, now electrify them with perhaps 100% renewable power. You get an offset for the times you have to run, let's say, a gas plant. That's the concept. So, I think that the reason I was pro, now, by the way, I'm not trying to convince anyone, that's just my opinion. But it brings so many more tools and potential processes to the table that we can get to that, to the goal. I think more capably.

Kurt Otis: Does the technology exist today to get to that zero?

Bill Howe: I think it does. I think it does. In fact, there are some companies that claim they are. I don't think any company claims are 100% renewable unless they're buying that renewable power directly. And there's probably some examples here of companies that are doing that. In fact, we talked about one yesterday. There are ways to do that today because there's so many more things. I will admit part of it is how you count. If it's 100% just the electric power you're producing, it's more challenging if you allow other things to be part of that mix, then net zero becomes more possible. Thank you.

Ann: Is this on? Hi, my name is Ann Debreeze. I'm not a very good talker. I live near Cortland, Nebraska, with a large solar array on my property. It's on the Norris Public Power lines. Thanks a lot for providing the time for the public to speak in this event. One correction to the speaker. I have heard it is possible to plant shade plants under solar panels for crops. And there are some farmers in Nebraska looking into that right now. I have hostas. That's a terrible plan. Climate change is my number one issue, which is why I'm here today. I have taken time to come here after my eight to five, Monday through Friday job on the day that my kids started school. As most of you, I am so busy. I hardly have time to think of ways to help with the mitigation of climate change, let alone taking action on it.

The speakers provided industry talking points, aim to help a business make money, but lack the urgency that we need to hear. The economics of providing renewable energy obviously considers the fuel cost is zero for renewables. The affordability of it right now should not be a factor and it needs to take a back seat to the urgency of getting up as much renewables as possible now. Politically, we hope the regulations will get better for renewables. In the past, fossil fuels have the unfair advantage. We took four years off addressing climate change, while one party protected the fossil fuel companies. Maybe the next four years, we will get 100% advantage to renewables. Like the tobacco industry, we need to punish fossil fuel companies. My speech to you is not be how to make money, but to tell you to take action and move quickly to renewable energy.

I ask that you put everything on the back burner and address climate change now. The west coast seems like it is on a burner now. I don't care how much it costs. Every day we hear the devastation that a warmer planet is causing on people's lives. We will all be much worse off with the conditions of a warmer planet in the future. The affordability part should be last and I'm glad it was tonight. We know if we don't spend it now to decarbonize fast, it will cost much more in the future, in money and in all the lives. All across the world, we have a shared concern, our lives, and we need to address climate change to improve all of our lives. Please do everything, including raising the rates of higher income people and large users of electricity, the companies, to get the renewable energy and shut down the coal plants. I remember when I chose to pay more on my electric bill to get two turbines installed near Lincoln. There are many tools you can use and they all need to be implemented to get renewable energy and decarbonized. Please take immediate action. The more actions, the better. We can't continue to just talk about the options that could help. Do all the options in your toolbox. Very soon, we will run out of time to address the problem. Thanks for your time.

Dan: It's Dan Schmidt from Butler County, Butler Public Power District provides my power. Just a quick comment on nuclear power. There is advanced nuclear powers, new certification by a new scale out in the Idaho, Utah. So there is new technology out there. Our neighbor, Wyoming, they're looking at Terra power for nuclear power. Just couple of questions, maybe for Tom Kent, when he comes up. I was wondering our event Valentine's weekend in February, if NPPD is done in the after-action report. And if they have looked at the results or how that event would have looked like post de-carbonization and the

whole SPP footprint, what would have that event looked like if we were already decarbonized? So, thank you.

Brad Kitchens: Good question. We, once we hear from Tom, we'll try to take that if that's all right, defer that for a few minutes.

Brad Kitchens: Why don't we just maybe two more questions that are up here and then I'll propose a short break and then we'll come back and hear from Tom, but please.

Bonnie: Okay. I think we are all concerned about how much this is going to cost. Actually, clean energy can reduce property tax burden for Nebraskans. Every year, nearly 12 million in property taxes is being generated from clean energy sources in Nebraska. In our neighboring state of Iowa, when companies paid 69.5 million in state and local taxes. There is something to think about. Also, clean energy can be cost effective more than fossil fuel. NPPD could actually decrease carbon emissions by 90%, without adding any expense to taxpayers. You can do that by replacing coal plants with wind power. We all know the significance of healthy communities. Creating more jobs. There are currently more than 3000 jobs in renewable energy, electricity generated here in Nebraska. Growing the clean energy industry in Nebraska means more good paying jobs in the rural communities. And finally keeping dollars in Nebraska. That's really important to me. In 2019 100% of Nebraska's coal was shipped from Wyoming. Rather than doing this, let's spend our money in our own state. We can develop our own energy and keep that money right here in Nebraska.

Brad Kitchens: Your name and city?

Bonnie: I'm Bonnie Cruz. Yeah. I'm from Seward and Norris is my public power company and we are also farmers west of Seward, as well as living here in town.

Brad Kitchens: Thank you so much. Appreciate that. And one more and then we'll take a break. Yes. Please.

Julie: Hi. Thank you. My name is Julie Condon. I live in Lincoln. My supplier is LES and I'm just here tonight. I really wasn't planning on making a comment, but from what I understand, NPPD is a public owned power company. And for them to not care about the cost to the public would not be very feasible. We just come out of COVID with the pandemic. A lot of small businesses have suffered. A lot of families have suffered. The cold spell that we had in February with the Texas situation put added costs onto our electric bills. And for people to say that they don't care about the costs to lower income families. I don't really feel that would be a good stance for NPPD to become public with, in my opinion.

Brad Kitchens: Thank you very much. Yeah. Again, I'll take a real quick answer or comment on that. It's a balance, right? So again, I keep saying trade-off I know some people want to prioritize one over the other, but you know, it's always going to have a cost element, an environmental impact element and a reliable, I think. And then to the gentleman that asked the question about what would the SPP situation in February have looked like if we were de-carb-, I don't know the answer to that specifically, but there is a misconception by many what caused that. And I just will add to that, that during that five or six day period, it was primarily that the issue was in Texas and people sometimes attribute the problem to the renewable

technologies. And it's not true that the problem was the gas production, so that at the wellhead and with the pipeline, and then the gas system fell about 50,000 megawatts short of what was needed.

And they had to shed 20,000 megawatts. It was really, now they have some problems with some of the wind technology as well, but the primary issue was the gas system in Texas. It wasn't winterized, the gas is prioritized to the home and not to the gas plants, all sorts of kind of unintended consequences related to ERCOT and some of the things that were going on down there. So, I just offer that as one suggestion, what we can try to address your, what would it look like if it was a de carb situation? I'm not sure. I know the answer to that, but we'll see if somebody else does. So, with that, we're, we're squarely on time. We have a lot of folks in here. We have some refreshments over there, I think in the interest of time, why don't we take 10 minutes? So come back at five till. I'll give a five-minute warning. You need to run to the restroom or grab a refreshment. And then we'll come back. We'll hear from Tom. And then we'll take more questions or comments. Thank you very much.

Alrighty. As everybody takes their seat, I'll go ahead and introduce this next section. So what we'd like to do for the next 60 minutes or so, and I'll remind folks that we do need to stop by 9:00. And if we're done before that, that's fine too, but we'd like to take a few minutes here-

PART 3 OF 5 ENDS [01:45:04]

Brad Kitchens: And if we're done before that, that's fine too. But we'd like to take a few minutes here in just a second and hear from Tom Kent, the CEO at NPPD. And then we'll have on what the current thinking is of the board and leadership and thought process is around decarbonization. What you'll hear him say is no decisions made us why we're having these public forums. We want to hear from the public across the state. And it's important that you have an opportunity to provide input into this process. After Tom has concluded, then once again, we'll do a couple polling questions, shocker. And then we will open it up to Q & A and comments, either questions you may have for Tom or comments that you may have for Tom, or all of us, questions for our experts. I'll continue to moderate. And I'll just remind you one last time, we'll need to hit the lights around 9. So, with that, it's my pleasure to introduce Tom Kent, the CEO of NPPD. And sir, the floor is all yours. Thank you.

### 3.2.1 Discussion Draft SD-05

Tom Kent: Thank you, thank you. Thank you. So welcome again, everyone. I really appreciate your willingness to spend three hours out of your evening with us. I know there's a lot of challenges, but this is a really important topic. And hearing from our customers and hearing your thoughts on this topic is, is very important to us. In the first hour, you heard a lot of background about how the electric utilities is put together, the kinds of things we think about, the kinds of things that we do from a management and operations standpoint for the organization. And in Nebraska, that's all under the umbrella of public power. So, our board is elected by you, our customers, to represent you and provide oversight to our organization.

And part of that oversight that they provide to us as they establish policies that we should be following as an organization. And those policies compliant and fit within the statutory structure that's established in the state. They also provide us guidance on how we should operate and how we should think about moving the organization forward. And those policies cover a lot of aspects. We refer to them as strategic directives. That's why that code word, Strategic Directive 5 is up there. That's the policy that the board is

currently considering having to do with our generation resource mix and their business risk around carbon emissions and how we should think about that as we move forward into the future and continue to modernize our resource mix and address all the various issues we address.

As mentioned earlier, we think a lot about reliability and the impacts of how we operate and build our transmission system and our generation plants to ensure that we have reliable electric supply for our customers. We think a lot about cost and how the choices we make to operate and build and construct and invest in our facilities impact the cost of our customers.

If you didn't get much out of this first hour, I hope you understand how important and fundamental the electric utility system is to a well-functioning economy in our country and in our state. And we are here to serve you all in rural Nebraska. So, the things that we've been talking about throughout this discussion, affordability, reliability, and resilience sustainability, those things are all very important. And what we strive to do every day is strike a balance in that. And that's what we'll talk about in terms of the thinking that we have right now is a starting point for the discussion on that policy guidance that our board is establishing for Strategic Directive 5.

I wanted to talk for a couple of minutes. I want to get back to the question that came up before the break about the February event and what my thoughts might be, what the impacts could have looked like had we had a system, I'm just going to say, 100% renewable resources just to give you an edge case. So talk about the February event a little bit. As Brad mentioned, the event was really about a lack of fuel and a lack of generation across a wide part of the mid-continent of the United States. And certainly Texas, which has their own little grid, it's referred to as... The operator of Texas' has grid is called ERCOT. And they refer to the Texas grid as the ERCOT grid.

And then the Eastern Interconnect of the United States, which is a giant grid, largest machine on the planet, as we talked about, is basically everything from the Western border of Nebraska to the east, to the east coast, with the exclusion of Texas. That machine in February, in large parts of the mid-continent of the United States, had a lot of generation that was unavailable because of an extreme cold weather event and lack of fuel supply. The primary fuel supply issue was lack of natural gas.

As Brad mentioned, the well fields were having issues. The ability to deliver natural gas, the piping system was having issues. The price of natural gas got very high; hundreds of times higher than what it normally is. And all of us were impacted by that. You were impacted by that in your homes if you're a natural gas-burning customer. We were certainly impacted by that as an operating utility. And in fact, we had two special board meetings to get authorization to purchase more natural gas over that four-day event so that we could keep our power plants running to serve you. So, there was also wind and solar resources that are part of this story.

Wind resources, as you heard previously, they harvest energy. They create a lot of energy, but they don't provide a lot of capacity or capability to keep the lights on as the system changes. So there's two important parts to assuring a reliable generation supply, reliable electric system supply to you. Also, when the switch comes on, you turn the switch on, you operate a steel mill. You turn the furnace on. You want it to be there right away.

The part that does the work, that makes the light, that's the energy piece. The ability to respond from a system standpoint, from a generation standpoint, is the capacity piece. That's what we measure in megawatts. So, the Cooper nuclear station is an 800-megawatt facility. It has 800 megawatts of capacity. It has that ability to respond instantly to changes in customer usage.

As I mentioned earlier, it's real time. Wind and solar resources are different, because we can't control when that capacity is available. Mother nature controls that. So, the amount of capability of a wind resource to provide that instantaneous, the lights are going to be on, is not the same and not measured the same as it is for a nuclear power plant.

That's why they're referred to as intermittent resources. Okay, we get energy from them when the sun shines and when the wind blows. And that's part of what we have to manage to ensure reliable supply to all of you as our customers. So in the particular event in February of this year, and I'm going to use the Southwest power pool, because we live in the Southwest power pool, I know their numbers. I don't know, ERCOT's numbers as well.

There's about 26,000 megawatts, and I'm focused on wind for now, of wind resources from a nameplate standpoint within the Southwest power pool footprint. The capacity value of that, the value that we can rely on, and we calculate that through some complex engineering analysis stuff, is in the 15 to 20% range. So from a system operation standpoint, we might have 26,000 megawatts of wind energy when the wind is blowing across the footprint, but from a reliability and operation standpoint, we're going to maybe count on... I should have used 10%. It would have been easier. We're going to count on 20% of that when we operate the system.

What we saw with wind and solar resources during that event from an operation standpoint, is we got, in terms of energy from those resources across the footprint, roughly what we expected to see from an operation standpoint. Okay, we got roughly the amount of winning energy during that event that we were forecasting to have during that event. And part of what we have to do to manage the system is we look out at these forecasts. We adjust all of our generation to ensure that we have a total generation supply that matches the total energy that's being demanded by our customers. And when we balance that, that's what keeps the lights on. And that happens in operating utilities like NPPD or OPPD or LES, or across the 14-state Southwest power pool footprint, every second of every minute of every hour of every day. That's the complexity of balancing all of this stuff.

So while we got what we expected, had there been more wind to blowing that day, it certainly would have helped. But that isn't the reason we had the big problem that day. There were thousands of megawatts of other generation that we normally can count on that weren't available because of the lack of fuel supply or because of those generating units actually were having issues with the cold weather. There were generating units in the southern part of the footprint that weren't able to start, had equipment break, equipment freeze. We're talking 30 degrees below Fahrenheit weather.

And if you're in Oklahoma or Texas and you don't design your facilities for that to happen on a regular basis, you are going to get caught and surprise. And that's what we saw happen in those states, to a certain extent with those facilities. So, get to the question of what would we have seen had there been a lot more wind on the system. We would have been challenged by still having to have other resources available to serve the load. Because the winds only going to blow based on what mother nature does. And we're only

going to get the energy from the wind based on how hard the wind blows that particular week, which we tend to see in the winter and we also tend to see in the summer across the entire mid-continent part of the United States, weather patterns typically are that the wind doesn't blow much in those cold winter days, nor does the wind blow much on the hot summer days.

So, in order to ensure reliability, in order to manage all these complex issues, we have to have a diverse resource mix. And a diverse resource mix and how we manage that is how we ensure reliability for you all and how we ensure low cost for you all. So more wind and solar on that day would have complicated things. More wind and solar on other days would have helped things. It's a mix. No one thing by itself can do it.

And that's why, as you saw in our resource mix, why we have a diverse resource mix, why we have a mix that's has nuclear and hydro and coal and natural gas and wind and solar. Because they all have their pluses and minuses. And we have a lot of issues and a lot of things think about. We're talking about carbon tonight, but we spend a lot of time talking about all sorts of emissions that come from our power plants. We haven't been regulated on power plant emissions by the EPA for decades. So we have to think not only about our carbon emissions, we have to think about other regulated pollutants and ensuring that we manage those issues in a way that beneficial to our customers.

That's part of the complexity. That gets back to what's really important, affordability, reliability, resilience, and meeting those sustainability goals. And that's the balancing piece that we have to do here. So, the experts are here at the front of the table. Anything you want to add or change?

Speaker 4: No, riveting, riveting.

Tom Kent: I can't remember where the question came from, but did I answer the question that you asked? If not, we're going to have a Q & A coming up. Okay, so back to the strategic directive. As I mentioned, the board sets policy guidance for us as management. That's their role as the elected representatives of our customers. That's one of the roles they fulfill is providing the oversight of the organization and the setting of the strategic direction of the organization.

And we have strategic directives that cover several things. This one is having to do with our carbon emissions. We have one that covers our cost competitiveness. We have one that covers reliability, where the board sets expectations for our reliability goals and what we should focus on, for our cost competitive goals and what we should focus on. We have one that has to do with safety and our expectations for safety. There's several of them.

This particular one is one that the board committee has been working on with management team. And it's important to understand that this is a starting point. This is a discussion draft. The wording up here makes it sound like, okay, this is it. Because it was written in the form of what it would look like should the board approve it. But this again, is the front end or actually the middle of our process, that we've been going through for a couple years to kind of address these issues.

This process actually started a couple of years ago with a subcommittee of our board and our customers and staff to start to talk about these business risks and start to think about what kinds of things we should consider. And here we are today, talking about some of those considerations. So again, this is a starting

point. We're looking for your feedback. The board is going to take the learnings from this session, their discussions, and they're going to continue to discuss and have dialogue on this strategic directive. And hopefully the board will make a decision on what it looks like, or if we should have one between now and then end of the year.

So, it's four paragraphs fits on one page. I broke it down here on the slide to make it easier to see the first paragraph. I'm not going to read every word, but I have it up here for a second. The first paragraph is really kind of the preamble. Think of it that way. It sets the stage. It talks about why the board is doing this. It talks about business risk.

We have a business risk. You heard what's going on around us, what we have to deal with from a regulatory standpoint, what we have to deal with from a system operations standpoint, what we have to deal with to ensure we serve our customers in the way they want it to be served with the products that they want. We do have customers that are interested in things like a 100% renewable. We do have customers that are interested in things like nuclear. We do have customers are interested in things like everything we do.

We have a customer we're working with right now. It's not our customer directly. It's a customer of one of our wholesale customers that's a large industrial facility. And they're in the process of building out their facility and expanding it, and for their marketplace that they work in, having a product that is renewable-based is very important to the customers they serve. So, we're their largest input. The electric supply is their largest input. And they're very interested in being able to show that the electric power supply that they use to make their product is renewable-based. So, we're working with them right now and our wholesale customer right now, to find a way to do that for them, those, those things are happening around us today.

We're also very active in things like looking at carbon capture and sequestration. We have some very beneficial, low cost, reliable power plants that are fossil fuel fired. So, if there's ways that we can develop and implement economic carbon sequestration and take the carbon out of the emissions that comes from those power plants, that helps us address that risk. And we're working with the federal government on some grants that they've given us to help analyze and study and understand that capability.

We're very interested in nuclear power. We are one of 21 companies in the United States that have the personnel, the technical competence, and the capability, and quite frankly, the license from the federal government, to operate safely and reliably, a commercial nuclear power plant. When you think about that base load resource and its ability to provide carbon-free energy, it's a big strategic advantage. And that's something that we want to maintain. We're very interested in new nuclear technologies and following those things closely. But again, it's a mix of things we have to look at. There's a lot of things to look at. This is a long-haul process, continuing to focus on reliability, resilience, affordability, and the environmental sustainability goals.

So, paragraph two, real simple. This is the current draft of the goal, looking for feedback and discussion. Net zero, so net zero includes doing things like offsets and credits that were discussed about in the first hour. An example of where we're working on that particular issue is we're working with the Ag industry here in Nebraska, Ag is the number one industry in the state. We're doing pilot projects right now with a large cooperative, looking at the capabilities for sequestering carbon in the soil. There's certainly Ag

benefits from a production standpoint. There's also the potential to create offsets that allow us to offset some of our generation emissions through that process. So, this is a process where we're learning and trying to understand how to quantify that and show that that is something that can be captured and sustained over time.

So again, the goal, net zero carbon emissions by 2050. That's the starting point. That's the discussion draft. As we heard in the first hour, that's a fairly common goal across the country in terms of where the utilities are going and how they're focusing, another plug for EPRI since I'm here. And we an EPRI member. They are leading an effort that's called the Low Carbon Research Initiative that we are part of, as is other utilities in the state and across the country, that they're looking at with the utility industry and other sectors like transportation, on ways to develop some of these solutions to address and reduce carbon economy wide over time, in a way that's affordable, reliable, sustainable.

So, the next paragraph has to do with expectations for okay, management, you need to track this and report on it. The board provides us oversight. We have to provide them objective information on how we're doing with our financial performance, safety performance, reliability, and certainly with carbon emissions. And we track these things today, and we're going to continue to track them in the future. But this basically says we're going to report on our emissions in two ways, on the total amount of emissions we have from regeneration resources in toms, and also on the intensity of our emissions from regeneration resources.

So, intensity is like looking at the mileage of a car. A car gets 25 miles per gallon. The intensity is the amount of pounds of carbon dioxide that's emitted per amount of generation. So, we measure it in pounds per megawatt hour of generation. So, it's like miles per gallon. It's a rate. It's an intensity. We monitor both. Both are important as we journey through this transition that we started years ago and we're in the middle of now, as we move forward, addressing these complex issues.

And the last paragraph is what I would call potential off-ramps. What this basically says is okay... And we've been talking about this, affordability, reliability, resilience, sustainability. It's balancing, finding the right balance, finding the right sweet spot, the way to serve our customers. So, what the board is saying here is that if in the future, there is a situation where this goal negatively impacts the reliability goal or the cost goal, that the board will step back and reassess whether this goal needs to be adjusted or not. It's all it says. They're going to keep their eye on all three of those pieces. So that's, it, fits on one page. I'm looking forward to the feedback and questions.

Brad Kitchens: Can I have your clicker please?

Tom Kent: Oh, yes.

Brad Kitchens: I can't poll it out this.

Tom Kent: Yeah, you got to do the poll thing.

Brad Kitchens: All right, let's do three quick polls. And then again, we'll go to live questions and comments. So, the first one is, in your opinion, is a net zero decarbonization goal by 2050 for NPPD, you

can read them, too ambitious, feels about right, not ambitious enough, don't have an opinion on this right now.

While you're scoring, Tom is right. Scott Madden tracks all the B carb goals out there. There's a lot, there's a range. But probably 70% of the many, many utilities that have B carb goals, and probably about 70%, half of them. Others are still wrestling with them, have this one at net zero by 2050. So, this is the sweet spot in the industry right now.

So, there you go. Not ambitious enough would be just shy of half. And about half of the remaining half or so, you think it's too ambitious. So, about 1/3 of there, and about 20% feel it's about right. So, the consistent, I think, with some of the other questions and the themes within those other questions.

Second question is this, the goal presented is a 30-year aspirational goal. How often do you think the goal should be formally re-evaluated by the board? So, in other words, how often do you... Is it one to five, six to 10, or 10 plus years that you think the board and leadership should formally kind of do a gut check, look at metrics, look at trends, look at all sorts of data, and potentially make adjustments to the, to the aspirational goal or to the goal? I'm pretty sure I know where the majority is going to land here, but let's go ahead and see the results.

Of course, why would you not kind of take a hard look at that on a pretty frequent basis? Data is going to continue to change, and trends are going to change. And I talked about the growth in renewables and technologies and opportunities. Maybe that will cause you to look at this situation differently. So why would you not look at that pretty frequently?

And then one more, of the information presented thus far tonight, what do you feel you need more information on? Risks, as it relates to carbon-emitting utilities, the core utility principles that balance of cost reliability and environmental impacts, more about NPPD's carbon reduction, discussion draft, or at this point, nada?

Okay, I think this was the number one on the hit parade last night as well, that this whole thing about the principles and the balance and the priorities and the weighing back and forth. Surely, I can't... If anybody cares what I would vote, that would be my vote as well. That's kind of the debate on the table is getting all that stuff right and figuring all that stuff out. So again, we'd love to hear from you, whether it's questions or comments.

While this gentleman walks up, I will say that Tom, I thought your explanation of SPP February incident, and I've heard multiple explanations, was the clearest I've ever heard. Everybody has the same issues, but I thought the way you described it was just spot on. So anyway, yeah. Yes, sir, please.

### 3.2.2 Second Public Comments

Jerry Brown: My name is Jerry Brown. I live Southeast of Crete, Nebraska. Norris Public Power District is my provider. One issue that I would like to see considered would be the footprint of generation facilities. I look at the footprint for Cooper Nuclear Station or the footprint for Gerald Gentleman Station and the amount of energy that they produce and the amount of land that they consume. And then I look at the footprint for a wind farm or the footprint for a solar farm. And I'm using the term "farm." And then the matter of energy that they produce and the amount of land that they consume.

I look out at the horizon off my front porch. I live out in the country. All I see is a wind farm. At night, all I see is these red flashy lights. And then I think about the amount of energy that's being produced and what's being consumed. There's other forms of pollution, in my opinion. There's air pollution, noise pollution, light pollution. So again, a delicate balance, a balance that hopefully NPPD can manage, that the board of directors will take all of this into consideration. Thank you.

Brad Kitchens: Thank you, sir. Thank you. Understood. Yes, please?

Ken Haar: Thank you. My name is Ken Haar. You got me, okay. I live in Lincoln now. For many years, I lived near Malcolm. And so, Norris was my provider at the time. I want to thank you for this opportunity. I spent eight years on the Lincoln City Council and eight years in the legislature. And much of my public life was spent on energy and environment. For example, net-metering was my bill. I think it was in 2009. I introduced the legislature to climate change in 2013. And for eight years, I worked on wind regulations, which make us competitive with other states around.

And I talked to John McClure sitting back there, and he and I spent a lot of time in the legislature during those eight years. And when I was on the Lincoln City Council, my bill legalized beer sales in Lincoln on Sunday. So that also was an accomplishment, I think. So, my context for being interested and being here tonight is climate change. And I think it's really at the basis of why we're here. There was a speaker at UNL some years ago that gave climate change in 10 words. It's real, it's us, it's bad, experts agree, and there's hope. And I want to spend just a little bit of time on experts, because it has to do with who do you trust to give you information.

The first experts I want to talk about are financiers. And this is from Bloomberg News. "The world's largest asset managers have joined a group of investors committed to cutting the net greenhouse gas emissions of their portfolios to zero." And this is 43 investment firms, including the biggest one that you maybe have heard of, called BlackRock, that has investment assets of \$9 trillion. And combined, these are 43 investment firms control \$22.8 trillion in the global economy. And they're all agreeing to target net zero emissions by 2050 across all their holdings.

And that largest, BlackRock says this in a letter, "BlackRock has committed to supporting the goal of net zero greenhouse gas emissions by 2050 or sooner. We are taking a number of steps to help investors prepare their portfolios for a net zero world, including capturing opportunities created by net zero." So, the other important point here is that there are opportunities that come along with going to net zero, and we're going to be seeing these.

The second group, I think, that a lot of us trust are doctors. And doctors say this, climate change is a public health emergency. And this comes from a journal of the American Medical Association called The Lancet, and finds that heat waves, air pollution, and extreme weather increasingly damaged human health. And the authors include dozens of physicians and public health experts from around the world. And these reports make an explicit connection between death, disease and burning fossil fuels. So, it's not just a matter of cost and reliability. It's a matter of public health. One of the authors says we have to stop investing in something that's a thing of the past and is actually subsidizing health harms. Climate change and air pollution have the same root cause, the burning of fossil fuels.

And then finally, the third group I want to talk about, just real briefly, are the scientists. And I have here a list, I won't read them all, of 198 worldwide scientific organizations, that agree that there's climate change and that humans are causing it. And these include the American Academy of Pediatrics, the American Association for the Advancement of Science, the American Chemical Society, the American Institute of Physics on and on, and finally, NASA is one of those as well.

So, if we look at the fact that experts agree, it's not just the scientists, but it's across all kinds of our lives. But there's hope. Oh, and finally, I want to talk about briefly, citizens and voters nationally and locally are aware and concerned about climate change. So, it's not as though we can't use that word because it'll scare people off. A recent Pugh Research Center poll showed that 60% of Americans agreed the federal government is doing too little to reduce the effects of climate change. And 79% said the US should probably prioritize developing alternative energy sources.

But the final thing is that there is hope around climate change. As one climatologist from the University of Texas, Katharine Hayhoe says, "there is no silver bullet, but there is a lot of silver buckshot." And the silver buckshot include wind, solar, battery backup on a massive scale, which will change things dramatically, transmission infrastructure improvement, as we have seen in president Biden's bills, electric vehicles, carbon capture, perhaps. Nuclear, I feel, will be an important part of that.

So, in conclusion, I think what the basis of we're talking about here tonight is climate change. And I would strongly encourage the board to exercise the leadership vested in their position to move forward with action goals. And I think we have a bright future for our children and grandchildren. Thank you very much.

Brad Kitchens: Thank you, sir. Well said, and thank you for beer on Sundays. Yes, ma'am?

Jan Bostelman: Hi, I'm Jan Bostelman. I'm from Brainard, Nebraska. And I'm in the service area of Butler Public Power. I also happen to be a nuclear chemical metallurgical engineer, and I have worked in the power industry for 41 years. I work not only here in Nebraska, I work around the world. Some things that I'm hearing today, I understand the board needs to move forward. I do have a concern though, because I have seen some things as we've gone and worked through some of this. If you go and try and push something for a carbon-neutral situation too quickly, by maybe closing facilities that are base load, I do have some concerns. And I know you're all going to be looking at this.

PART 4 OF 5 ENDS [02:20:04]

Jan Bostelman: And I know you're all going to be looking at this. Does NPPD then become a net purchaser of electricity from SPP market, rather than a net seller? Does that pose some kind of a risk and detriment to our customers? I know you've kind of talked a little bit about that. Then also we do have in our constitution, we have required elements within the state, as far as the utilities, yes, providing reliable energy and affordable. So those things, I know you've all got to wrap your heads around that and understand that. I just wanted to see... Be aware of, if you're trying to do something too quickly, there are consequences always when we do things like that. My last plug, like I said, I consider myself an expert in nuclear power, and new advanced nuclear technologies, they're here and they're being built and they're going to be built in Wyoming, Washington State, and we've got a lot that is very promising with this, and so I'm very encouraged with the future on that side. Boy, if anybody wants to have questions about that, they can find me.

Brad Kitchens: Thank you so much. Yeah, SMRs are right around the corner, we hope. Yes, please.

Ben Wittiger: Hello. My name is Ben Wittiger. I'm from Lincoln, Nebraska. I'm served by [inaudible 02:21:35]. I am here today to encourage the NPPD board to adopt a more ambitious carbon neutrality goal. LES committed to 2040. I would like to see NPPD commit to 2040 or earlier, 2035 perhaps. A 2015 report by scientists at the University of Nebraska found that climate change will result in increased flooding, increased droughts, increased storms and increased wildfires in the State and increased intensity of those events. When we think about this conversation around cost and reliability, if farms are underwater, if ranches are being burned, I mean, they're not going to care about a 5% increase in their electricity rates or some potential costs that come from shifting into renewable energy.

So, I'd just like to encourage this board to make ambitious plans and I'd just like to reemphasize the reports published by Ascend Analytics Commission for this board that found that the first 90% of the transition will not result in any rate increases over what would otherwise be, and given that reality, it's just so important that this board works to protect the environment that we enjoy here in Nebraska and our agricultural industry it depends on. Thank you.

Brad Kitchens: Thank you. Nice job. Thank you. Yes, sir.

Bruce Bostelman: Good evening. Good evening. My name is Bruce Bostelman, I'm State Senator from legislative District 23. I live in, I've rented on a farm. Butler Public Power District is my supplier. I also, full disclosure, so I am also the chair of the Natural Resources Commission and Committee. We are doing an investigation LR study specifically on what happened with the SPP and how that affected Nebraska and how that affected you. Over the interim, we've had one hearing that lasted over five hours. We'll be having another hearing later into this fall. But with that, one question I do have with NPPD, I would like to have someone send it to my office, if possible, as I would like to know, as far as your carbon, what your generators are and how much they are by each generation facilities. So, if it's [inaudible 02:24:07], what is that?

If it's another source of like one of your gas fire plants, what is that? I just like to know what that is since we're talking about de-carbonization. What is it and where is it? So, I have a good idea about that. With that, a couple other things I'd like to know specifically to your handouts that you had here, resiliency is recovering and safety. I want to go back to what happened to SPP a little bit, and what we saw happening to SPP. Mr. Kent did a really good job at trying to explain a lot of things that happened there, and a lot of it dealt with base load generation. We didn't have it. We didn't have it in certain areas so we had some areas that we had problems with congestion in that. And Nebraska there's areas in Nebraska that we cartel tell power.

I was sitting in Superior Nebraska when the lights went out, I called the utility manager and said, what's going on? Omaha, OPPD had to cartel power, but yet we're buying power giving power out of Iowa or send it to Iowa. So, there's some challenges there. And my question comes down to on your handouts or on your slides, slide nine and slide 28 specifically. And that talks about integrated energy network and technology. And I want to understand from every standpoint, as we look at that, what is coming up?

We have a huge footprint, SPP Texas, North Dakota, Montana, all across. It's a large area, as we said, a huge, biggest machine in the country. How is new technology? How is integration? And when you're talking about dispatchable and non-dispatchable energy, how is it, or what are you working on to apply to that system so we don't see what happened again in February in June? It's happened in MISO, it's happened in SPP, it's happened in California, it's happened in Texas, it's happened in North Dakota, it's happened in Minnesota, it's happened in New York state, it's happened across the country, whether you're an Archie or not, it's happened. So, as you're talking about, we're seeing continually flexible system, what are you working on? What technology is out there that's going to be coming forward to help us or help SPP manage that better? I'll let you answer that question. If you could, please.

Dr. Tom Reddoch: I made a few notes here to myself, so I could on some of the comments that Tom made and there really are applicable to the question that you're posing here. So, the first thing that, let's backtrack and be sure we all understand how this large machine actually sustains on a regular basis, it's achieved on a real-time basis. That's why when you throw the switch, the light comes on. You have to keep a steady balance between your supply and how much connected load you have out there.

One of the points that I tried to emphasize in my opening comments is that the key to that certainly today is flexibility. And one of the interesting things, if we use Texas, which was our good example, to be able to zero in. The Texas grid is very inflexible. And the reason being, to achieve that balance, it largely does that by managing the supply, they have limited ability to manage the load. So, when fuel became precious and they were losing supply, they had limited ability to extract load quickly. In fact, they were in a pain point for an hour and a half before they took some pretty heroic actions to be able to get supply and use imbalance.

One of the powerful things going forward is to increase that flexibility on being able to manage load, the heart and soul of that is communications technology. And when you look at IEN mixing communications with the power supply is what's what I will call is the critical combination. So, this business of getting out of balance, we need more assets to achieve that. That's point one I want to make. Point two is there was a time when we had far greater diversity among our supply sources. And in fact, we had very little coupling between the reliability of the gas system and the reliability electric system. As we have gone to rely more and more on gas. And why did we do that? We took coal out of the mix. That's why we have more gas. We couple these two systems. Now systems which have some robustness of independence, we've lost that. And this is one of the perils of what I call technology transition.

And as we try to increase what I'll call our clean resources, we're going to go through some bumpy periods. That's just the truth of the matter. It's kind of interesting if you look at Texas and you ask the question of the fuel options they had, which one was most available? Anyone care to speculate? It was nuclear, the number one available asset during the Texas crisis. So it is, I think it's all part of the... It's all part of, of trying to get this combination to work. So IEN is really important because getting more flexibility will avoid these problems in the future, or at least minimize them. I don't believe they want to add.

Bill Howe: Yeah, I just have a couple comments. So, one of the things that it's been very striking to me is we do all of our planning. In fact, we live our lives based on models. We think about our experience. We think about what's likely. If I get in my car and drive my model is, I'm going to have a gas station every 20 to 50 miles, just as a simple example. And I model my behavior based on that. I drive by gas station after gas station after gas station and wait until it gets below a quarter tank, or I need to use the bathroom

and I pull over and it's there. The resource is there for me. What's challenging today is that these extreme events are showing the vulnerabilities of our old models in anticipation of new extreme events, the tropical storm, Sandy illustrated that in New York, for example. Fukushima the disaster at the power plant in Japan showed the failure of models. Updating our models so that we anticipate and can do our planning and management based on the new extremes is extremely challenging and it's potentially very expensive.

The models of operation in Texas did not obviously take into account the weather extremes that they experienced. Now, they probably will. We still have the challenge, though there's a saying you're always fighting the last war. They'll probably be a lot of winterizations that goes on in Texas now, but who knows what the next extreme event is going to be? Is it going to be wind? Is it going to be massive hurricanes, which they've also experienced? We don't know, but that's got big, big part of it. The second is that, as I presented with the simple grid models that we had before, all you needed to know is the voltage at the output of the plant. And you knew everything that was else that was happening in the grid. It was so easy to model it, power flowed one way and we knew what was happening.

Today to Tom's point, we need much more active monitoring at many more points in the system so that we can see changes as they're happening and not wait that precious 30 minutes or an hour to respond. That again, feeds into the model, that data feeds into updated models and we can do a better job in responding. And I just think the resource mix keeps coming up again and again, and again. We need to have diversity and that diversity happily can be across a broad geographic area. So, I think at this stage, all we can try to do is learn everything we can, the actual facts and what we could do differently that would have affected the outcome and learn from that and build that into our new models and management. I don't know what else we can do.

Bruce Bostelman: I mean, I've seen the reviews from SPP. There are four reports have come out. We're reading those; we're going through those. And my curiosity was technology-wise if there's something different because it's communication as one of the things it is. Plus, the other is generation capability, base load the generation. If we don't have base load generation, if we don't have reliable, if you don't have the capacity, the capability of providing that energy that you need right now, then, how are we going to handle that grid to keep that going out? And I happen to my curiosity was just if there's some technology that you're looking at.

Bill Howe: So, the one example that I became aware of you and just in the last couple of months is there's been a lot of talk about hydrogen. Hydrogen is best understood in my opinion, as an energy storage mechanism that you can happen to make with electricity. So, one scenario is, do you make massive, some very significant amounts of hydrogen store them and then use them to run turbines, as an alternative and zero carbon fuel when you need a rapid response to loss of other generation? That could be an interesting technology innovation that's green, zero carbon, and provides a lot of the kinds of resources. So, it's just one example that I've actually seen proposals for this, of using hydrogen to provide that peaking capability. So, there's one example that comes to mind.

Bruce Bostelman: Sure. And I think that's important. And my last point is going to be, I think that's important because on your slide 31 of that economy wide decarbonization note I put on there is how do we meet this demand? And if we cannot meet the demand now, how are we going to meet it in the future? Because we're seeing black brown outs black outs. I mean When we came this close, this close folks to being down no electricity for months, months. So how are we going to make sure, can't eliminate all the

risks, but how are we going to make sure, this hasn't happened just once it's happened a couple of times already. So, how are we going to meet that demand in the future? And part of it, I think that the board needs to consider what you're working on. As you have to have that base load generation you have to have that reliable energy, you have to have that energy that is available and what that energy might be I think that's something that's worth discussing. So, thank you.

Brad Kitchens: Sir. Do you have a comment?

Brad Kitchens: [inaudible 02:36:28].

Brad Kitchens: Just a couple more. Yes.

Ken Yates: Question and comment. My name is Ken Yates. I live at Hallam Norris PPD supplies us. We're talking about decarbonization here, very important. And from that standpoint, I would like to suggest that we have missed a very big opportunity to decarbonize Sheldon station, which is my neighbor there and has been for many years. And you mentioned Mr. Kent, the big corporation that you're dealing with on this regard is Monolith. And I would like to know specifically why is it that we were told as citizens and residents in our area here, that they were going to loop their excess hydrogen over to Sheldon and stop the coal burning at Sheldon. We all know the facts, it hasn't happened and it isn't going to happen evidently, but I would like you to shed light on this for us all. That's my question. Thank you.

Tom Kent: Sure, great question. I'd be happy to, this is a discussion we've been having with our board for over a year because it was about a year ago at this time if I recall correctly, maybe two years ago, COVID has got me messed up, but we did when we first started talking to Monolith and worked to help get them to the state of Nebraska. The initial business case supported converting one of the Sheldon units to burn the hydrogen in the boiler. And so we would be burning that instead of burning coal in that boiler. So, we went through a process with them to understand the economics and the technical issues of doing that. And it really came down to an economic decision by Monolith. Monolith determined that the hydrogen was more valuable to them to use in other ways. And they're going to make ammonia fertilizer with it, then selling it to us to burn in a boiler it's would have been a great fuel.

We were actually looking at other ways and still are because we're still very interested in hydrogen at other ways to use that hydrogen had we gotten it, or in other ways to use hydrogen that we're talking about today through other sources that provide more value to our customers than just burning it in the boiler. Burning it in a boiler would have been great and nice, but in the long-term scheme of things, we were looking for better ways to use it as well. Monolith made a good economic decision and an economic decision we support. So now we're looking at other things to do with that facility and our other facilities as we address all these complex issues. It really boiled down to the economics of how you could get the most value out of that product that they make was hydrogen. And that's the answer.

Ken Yates: They blamed it on you guys.

Tom Kent: Yeah. I know the president of Monolith really well. [crosstalk 02:39:49]. Yeah, okay.

Dan: Real quick. Dan Schmidt, Butler County and Butler Public Power District. You were talking about modeling and risk assessment. I'd like to suggest one more. We got NPPD, OPPD, LAS. And I consider NPPD

the rural electric provider. If we're talking about doubling, when deployment in five years, where does that go out into the rural areas? Is there zero risks for both of you? Is there zero risks deploying, more wind out in the rural areas, has anybody looked at it? I'd like to see an added risk assessment of deploying more of wind out in the rural areas, to the rural residents. What's the risk to those rural residents?

Tom Kent: Hello. There we go. I think that's a great question and a great point and a very difficult issue right now for Nebraskans. And it's going to depend somewhat on the local community, but just to express it in risk in terms of community acceptance and whether they want to add wind or solar in their community, not everyone feels the same way. So, the risk is an important factor and important consideration. As you look at adding new resources, whether it's wind or solar or something else, you got to also understand the impacts on the local community and how the local community feels about that. And there's certainly a portion of the local community around the state. I don't want to characterize any particular area, but it's certainly a hot topic and certainly a topic that's created a lot of controversy in various parts of the state as they discuss that and deal with it.

Brad Kitchens: It's a matter of prediction, the projection of doubling, of course, it wasn't Nebraska, it was nationwide. And a lot of that is expected to be believe it or not off shore. So, I don't know if it will be disproportionately experienced in off shore, on the east coast or not, but just an FYI. We have two more please.

Nick: Hi, my name is Nick. I'm a Wink resident LP, pardon me, LES. My dad was one of the people who spoke in the first Q and A session. And I just wanted to... well first off, I have a quick question for you guys. In a couple of the slides, we've seen market increase in the proportion of nuclear that makes up our mix from 2005 to 2019. I was wondering, given that Cooper is basically it and new generation hasn't come online at that time, where that came from in our case, I'm sure that's a one or two sentence answer somebody knows.

Tom Kent: I had the one or two sentence answer. So, Cooper nuclear station has been an 800-megawatt unit, roughly support as long as we've owned it. The difference was from that 2004 timeframe to now is at that time, quite a bit of the output was being sold to other utilities. So, we weren't counting that as part of our generation, LES got a decent sized chunk of it, MidAmericanEnergy in Iowa got a decent sized chunk of it. Those contracts ended; it now becomes part of our portfolio. We're using it to serve our customers. And so that's why you saw that increase.

Nick: I got to visit Cooper in college. It's an impressive facility. I really hope we can keep that going along into the future. As far as something to expand on the discussion, I would just like to point out that some folks have brought up a concern around the idea that maybe speakers so far discounted costs more than they should. My dad being one of them here. And I just like to point out that it's a matter of degree and there's almost certainly some point that all of us can agree to work together, to achieve, and to give just a little context to where dad was coming from when he said that we can't be considering cost as an object that was more extreme on his part than it sounded. He's in poultry and after labor, electricity is his biggest input. His business is major electricity consumer.

If you add too many percentage points to the cost of generation, you put him out of business full stop. And so that's where he's coming from. And he's willing to take that lift, but I think what we're all... One thing we can all agree on is that what we don't like to see is small ineffectual actions smattered around

that get lost in the aggregate, that doesn't help anybody [inaudible 02:45:02] public power districts. Really, as I understand it fairly unique in the scope of power providers nationwide in the way it's organizationally structured has really contributed to today, the high reliability and competitive costs. And that's because they really, really are answerable to us. And so far, their mandate has largely been reliability and cost. And they've delivered speaking on decades, long timescales here.

And if we want to take some action that isn't ineffectual and scattered and gets lost in the aggregate, the way we do it is through these organizations that are here speaking to us today. And all I would like to ask from all of us is that we endorse adding some degree, a negotiable degree of concern about carbon footprint, going forward to that mandate on top of cost and reliability. There's some amount we can agree to. It's hard to say how much, but I think that there's something to be done here. And this is the path to do it through is through these organizations.

Brad Kitchens: Last one. Yes, sir.

Cliff Messner: Good evening. I'm Cliff Messner from Central city. My provider is Central city itself, which is a wholesale customer of NPPD date. I am a real estate developer that has started doing some solar development, as in alignment with that. Most of the housing that we do is for people who are living at 60% of very immediate income or below, many of them are at 30%, of very immediate income or below. So, I try to be sensitive to their affordability side of things, because those people are the first ones that are hurt. For myself, I live in a net zero carbon house, and that includes driving by electric cars. It's all powered by solar.

One of the risks that I want to talk about is the risk of public power being left out of this thing. We are working very hard to do solar that's integrated with public power. And I think that's incredibly important. I would say imperative that public power is involved with it. I'm obviously a big fan of public power, but we're seeing a growing number of customers coming to us and saying, I want to go off the grid, or I want to do self-generation. And some of this stuff is going to move forward with, or without us. We had a customer call us this spring saying, I want to go off grid. We said, well, it's expensive. It doesn't make a lot of sense. The response was, we've got \$5 million to spend on it. We already have a gas generator backup. Can you get us there?

And we said, well, the study itself would take \$45,000. And they said, who do I write the check for? We've had ethanol plants approach us saying we want to go off grid. I don't think that's good for where we are. I think we have to make sure that this thing is integrated with public power. That's why I'm grateful that you're getting started on this. I urge you to move it as quickly as you can, because it's very complex and it's going to take a long time to sort it out. But we are seeing in the last year, a real push that we haven't had before, where people are saying we want a different system and I don't think that's good for us. And I just want you to be aware that that pressure that we're seeing in the field has really mounted in the last six months to a year. Thank you for your time. I really appreciate what you're doing and encourage you to move as quickly as you can. Thank you.

Brad Kitchens: Thank you, sir. We'll turn it over to you in just a second Tom, but from my part, thank you everybody. Again, I can't over express how important this is to the process. I really appreciate your thoughtful comments and questions, your respectful comments and questions, and well done. And Mr. Kent I'll let you close things out.

Tom Kent: Yeah. Thank you all again for being here tonight. I appreciate the feedback and the opportunity for you. This takes an evening for you. So, thank you for spending your time with us it was good session. I really appreciate all the feedback that you provided. One last thing, the survey we talked about at the beginning as a way for you to provide direct feedback through that mechanism after this session, it'll be open till September 1st, you can find it on [www.nppd.com](http://www.nppd.com), which is our website. You'll also potentially see it on your power provider website. Our wholesale customers may have that up on their site as well, a link to get to it. So, I hope you take the time to fill it out. Your opinions, your thoughts are very valuable. That's what public power is all about is serving you, our customers. So, thank you. Have a good evening.

PART 5 OF 5 ENDS [02:50:23]

### 3.3 North Platte

Timothy Arlt:

Let's do it. I got the hook at the other ones too. Okay, we're going to go ahead and get started. On behalf of NPPD's Board of Directors, management and staff, we certainly appreciate you all being here tonight. Taking time out of your busy schedules to provide us some valuable feedback and public comments and that's what tonight's session is all about. My name is Tim Arlt, I'm the vice president of Corporate Strategy and Innovation at NPPD. Just some housekeeping notes here, and then we'll get going. One, we're at this campus. They've asked or suggested that you sign-in. It's not required to sign-in, but if they have to do any contract tracing, they would like to know who is here. Again, it's not required. But if you want to, there's sign-up sheets at front. If we hear the fire alarms, we're to exit through one of the various exits and must throughout the parking lot. If the tornado alarms happen to go off, we need to progress down the hall to the right, take a left, and then another right to the shop areas, Rooms 303 and 305.

Timothy Arlt:

So some quick facts about NPPD, NPPD is Nebraska's largest generation and transmission utility. We are also a subdivision of the state of Nebraska. We have approximately \$1.2 billion operating revenues every year. We own and operate 31 generation facilities providing 3,600 megawatts of diverse generation. So to give you some scale, the community of North Platte peaks about 70 megawatts. So that's how much generation NPPD owns and operates throughout the state. We own and operate over 7,800 miles of transmission lines, serving parts of 86 of the 93 counties in the state. We employ roughly 1,900 teammates across the state, providing valuable jobs in all those areas. We provide power either at wholesale or retail to 403 of Nebraska's 530 communities. We work in partnership with other utilities like city of North Platte or Dawson Public Power District to serve more than 600,000 Nebraskans. We're governed locally by an 11 member-elected board of directors.

Timothy Arlt:

Our mission is to safely generate and deliver reliable, low-cost, sustainable energy and related services while providing outstanding customer service. Based on our 2022 proposed rate schedule, wholesale customers will experience no increase in their base rates for the 5th consecutive year and our retail

communities for the 9th consecutive year. Public power in Nebraska provides rates that are competitive and low nationally. Nebraska's residential rates were ranked 8th lowest in the nation according to the latest Energy Information Administration data. NPPD's residential rates are below the state average. NPPD's strives to power our local economies and find innovative, practical solutions to environmental, social and community needs.

Timothy Arlt:

We are not for-profit, controlled locally and focused on our customers. We would not exist without our customers. So why are we here tonight? We're here to start the conversation and get public input on the value of public power in Nebraska. NPPD's current and future generation mix and the state of decarbonization as we prepare our next integrated resource plan, to be completed in the spring of 2023. NPPD's board continues to move forward with the development of sustainable carbon emissions reductions strategic directive that will include carbon reduction goals for the district. NPPD is committed to seeking customer feedback as a not-for-profit public entity of the state, which is governed by local constituents. We aim to operate with transparency and open communication.

Timothy Arlt:

This is the third of five forums we're holding across the state to receive public input. Conversation today will specifically be centered around the risk of being a carbon emitting utility. How NPPD's carbon reduction goals should be structured? What principles, reliability, resiliency, affordability, environmental impact are most important to maintain as NPPD works to reduce its carbon emissions. So what are our goals for tonight? These topics are very complex, certainly if you're not working in this industry. Our goal is to give you a good, general understanding of them so you can provide us with valuable, informed feedback. We ask that you try to hold any questions till after the presentations to ensure that we get through the material. Please, take what you learn tonight and apply it to this initiative by completing a survey found on [nppd.com](http://nppd.com) or one of our wholesale partner's websites which will drive you straight to that survey.

Timothy Arlt:

Speakers from the Electric Power Research Institute will provide background on the topics for discussion, the slides will be available on [nppd.com](http://nppd.com). Live polling will be conducted throughout this night to gather collective feedback. NPPD President and CEO Tom Kent will speak on discussion draft of the carbon emissions' goal. There will be plenty of time throughout this evening for your feedback and questions. We are recording this meeting to capture all of your questions and comments for further analysis. Brad Kitchens will be our moderator tonight. Brad is the CEO of ScottMadden, he has over 30 years experience as an energy management consultant.

Timothy Arlt:

We do have a few other ground rules. To provide comments, we ask that you come to a microphone, provide your name, what city and state you reside in, who your electrical provider is and any other affiliations you may have. Comments should be concise, our moderator may limit the time if necessary to ensure all attendees have a chance to speak. Please, if you can stay on topic, this is not a debate about

client science nor is it about NPPD's performance in the past. Comments should be simple, please respect other's opinions and refrain from debating one another. At this time, I'd like to introduce the mayor of North Platte, Brandon Kelliher. He's with us tonight, thank you. We also have two board of directors with us this evening. Director Bill Hoyt, he serves this subdivision and district, and Wayne Williams, who is en route, he should be here within about five minutes. Oh, there he is, he's made it. At this time, I've asked Bill to provide a brief welcome for the board.

Bill Hoyt:

Across the information you provided it's extremely important to give the board a good idea of what everybody's expectations are. I represent District 4, as he said, which is Lincoln County and the six counties in Southwest Nebraska. I'm actually from McCook or south of McCook and McCook Public Power is my provider. But they are also NPPD's customers, but I want to hear from everyone. Well, to me personally, we're going into a lot of interesting challenges and opportunities as we go forward. And I don't have the answers yet, so I'm hoping that we'll hear them. Thank you.

Timothy Arlt:

Thank you, Director Hoyt. At this time, I'd turn it over to Brad Kitchens to run the meeting.

Brad Kitchens:

Thank you, Tim. Good evening and let me also offer my welcome to everybody. My name is Brad Kitchens and it's a pleasure to have the opportunity to host or moderate these five town hall sessions. I think Tim did a really nice job at setting the stage for what we're trying to accomplish today. As he mentioned, we had sessions last week at Norfolk and Seward and they were terrific. The participation I think we're seeing today, probably a lot more than many of us and board members might've expected the feedback, the input, the points of view were again, just terrific. We look forward to the same this evening.

Brad Kitchens:

As Tim mentioned, I want to emphasize, he had two bites of the apple. One bite is your input this evening, and as he mentioned, the survey is the second one that I would really encourage you to go to the website at NPPD and it's about a 5 or 10 minute survey. What's really good about it is it directly focuses on the topic that's on the table tonight. And for many of the questions that are on the survey, it also provides some useful information about those particular topics, what are the utilities doing, what sort of carbon increases are we seeing, why does it matter. And so again, I encourage you and encourage you to encourage your neighbors and friends to take the survey. It will be very helpful to all of us.

Brad Kitchens:

The agenda is generally as follows, to my right and left, we have two experts from EPRI that Tim mentioned. They're going to take about an hour, 30 minutes each, and set the stage on what's going on in the industry. So just everybody has the equal footing in what the issues are, what the challenges are, what others are doing, etc. And then, I'll moderate some Q and A or be seeking your input for about 20 or 30 minutes, that will be about halfway into the session. We'll take a short break, and then we'll come back

and as Tim said, we'll hear it from Tom Kent, the CEO of NPPD. He'll share what everybody, what the current thinking is and as Tim said, and emphasize current thinking subject to these town halls and others on what the board's views are on decarbonization at NPPD. And then again, we'll have about 20 or 30 minutes where you can either ask Tom questions or you can provide comments.

Brad Kitchens:

As I said before, we do have to stop sharply at 9:00 so just understand that that's the game plan. And also as Tim mentioned, I encourage folks to be fairly concise with your statements. I will say one of the sessions last week, we had some long-winded folks. I do this a lot and I can promise you, after about three minutes, ain't nobody listening. You're just talking to yourself, so I really would encourage you to be fairly tight and concise with your comments. We want everybody to the extent that you have a comment that you want to be heard, we want you to have that opportunity so that would be my request.

Brad Kitchens:

Polling, let's... We want to do some live polling after each of the speakers and we'd like to encourage you, you have one or two ways which you could do polling. And my strong suggestion is that you go with the left version here which is to go on to your browser and on to pollev.com, google pollev.com, it's that straightforward. If you go into that website, it'll ask for your username, you put in nppd999. It will ask for your name, just hit skip and you're in. And you can just leave that open all day long and you can engage very, very easily with the polling we wanted. And we probably have six or eight polls that we like to do throughout this session, including one here in just a moment.

Brad Kitchens:

If you prefer to text, that's your other option on the right-hand side where you would normally put in the phone number. All you have to do is put in the number 22333, and then where you put in your text, you actually put in nppd999 and then you're in. You don't get to see some of the screenshots quite as well on the texting feature as you do the pollev.com, so I encourage the first over the latter but both are available. So with that said, let's do a quick test and see how many folks we can get online. So one of those-

Heidi:

Before you take the test, if you misfollowed the directions, they're at the bottom of your blue sheet.

Brad Kitchens:

Of course. Thanks, Heidi.

Speaker 1:

Not caps sensitive?

Brad Kitchens:

Not caps sensitive, no. Yes?

Tom Kent:

Okay. So for NPPD staff here tonight and I know who you are, I really value your opinion, not tonight. So don't respond to the survey information tonight, we want this to be about our customers.

Brad Kitchens:

Yep. Thanks, Tom. I should have mentioned that. Yeah, just visitors only. So this is the first question, we'll see what kind of responses we're getting. So the topics presented, what is the topic that you are most interested to hear about this evening? One is the risk associated with being a carbon-emitting utility, that's A. If you're on the texting, you just do A, B or C. B would be you want to understand what NPPD's carbon reduction goals should be or three, and you're going to hear a lot of this tonight, you like to understand the trade-offs between cost, environmental impacts and reliability when we talk about this topic of decarbonization. They're all related, I appreciate that, but you had to select one of those three as what you're primarily focused on, what might that be. You can see on the lower right-hand corner, we've got about 25 thus far that are weighed in. A lot more than 25 in the room, so we'll see if we can get that up closer to 70 or 75.

Tom Kent:

[inaudible 00:16:21] some seats at the front.

Brad Kitchens:

Yep. Anybody would like a seat, there's a couple here in the front row. I appreciate the reluctance with that. 32, I hear a Brad. If anybody has any questions, we can send somebody over to help you get on if you're having difficulty. We surely have a lot more than 32, unless you're just not interested in participating. Any others have difficulty?

Speaker 2:

[inaudible 00:16:57].

Brad Kitchens:

Do you have a smartphone?

Speaker 2:

No, I got a cellphone.

Brad Kitchens:

I don't know.

Speaker 2:

[inaudible 00:17:08].

Brad Kitchens:

Again, let's take a couple minutes and try to get this first one right because it will be several throughout the course of the day. Anybody else need some help? No, you go to pollev.com. Again, pollev.com is the easiest. The username is nppd999, then hit skip and you're in. We've got 40 up. All right, I'm going to keep us going. We have 40 and again, we're doing several of this so answer the question overwhelmingly and appropriately. Anybody wants to understand better kind of the trade-offs, the principles, the balancing of these three really important factors. But two gentlemen to my, again, right and left, they're going to talk a lot about this. The issues as they relate to cost, reliability and environmental impacts.

Brad Kitchens:

One thing I think is also important, I'm sure you know this but to the extent that you don't, I work with utilities across the country. IOUs, public power, co-ops, everybody is wrestling with this issue. This is not a NPPD-focused or unique challenge. Everybody across the industry is trying to identify what their carbon goals should be and of course, NPPD is doing the same and is eager to get your input. So real quick show of hands, one of two choices. Choice one is I'm pretty familiar with the power industry, I know how it works, I know how it all places out versus I'm somewhat a novice, I don't really understand it well, I'm curious, I'm eager, I want to know more about it. How many folks fall on that first category that I understand the power system pretty well? At least half. How many would characterize yourself as the second half? I'm curious, I'm... So an equal number, roughly.

Brad Kitchens:

What we're trying to do for everybody's benefit is for this first two speakers is really speak to that second crowd. We want everybody to understand how the power system works, what the trade-offs are, what the considerations are before we get into your comments and questions. So please, bear with us when we do that. I'm going to get us rolling because I want to keep us going. So EPRI, as Tim mentioned, Electric Power Research Institute, if you haven't heard of EPRI, it is the go-to organization inside the power sector for research and development. And these two gentlemen are experts in this topic and a range of topics around the power sector. To my right, Dr. Tom Reddick will be our first speaker. He's going to talk about the priorities of electric services, basically how the system works and again, introduce that concept of cost, reliability and environmental impacts. Then we'll hear from Allen Dennis, who will talk to us about the business risks of carbon and decarbonization. So we'll start to really home in on the topic of the day. And again, as I mentioned, we'll hear your comments and then we'll hear from Tom Kent.

Brad Kitchens:

So Dr. Reddick is a technical executive at EPRI for power delivery and utilization. He focuses on things like energy efficiency, demand response, EV's or electric transportation, electrification. He's also spent the last seven years working closely with the Department of Energy, helping them identify the next generation

of electric power engineers. He has a 35-year career, he was a former professor at University of Tennessee in this very same topic, so I think it's safe to say he knows this topic well. So with that, Dr. Reddick, I'll turn it over to you, so thank you for joining us.

Dr. Reddick:

Thanks, Brad. Let's see here if I can... I have a booming voice... Can you pick... Okay, we're good to go now. So first of all, I'm quite pleased to be here tonight. My associate Allen Dennis, he and I will share a little with you about what we do at the institute and also, how it relates to these important issues that we're facing about our future energy situation and how we might address it. So let me just do a quick intro to EPRI, so you have a little bit of a background about who we are. Our mission really is largely about addressing technology that meets the fundamental mission laid out here, that is technology that will keep electricity very affordable and most importantly, reliable. We've all gone to the notion that when I reached to touch the switch, the light comes out. That only happens when you have a reliable system. And when you build a complex system, there will come a day when it will fail. It's inevitable. It happens too in our cars, by the way. The day you get the flat tire, well, the thing stop and you got to deal with it.

Dr. Reddick:

So we introduce another principle which is resiliency and that's getting service back quickly and that is really part of our overall. But in recent times, things have had to change more than anything else. It's the role the environment plays and that is how do we meet these goals, a low-cost electricity that's reliable and resilient but we do it with minimal impact on our environment. That's what we're trying to do, we're trying to bring technology forward that really allows us to take these four things and make them work as a happy family. As you will hear as we go through, the connectivity between these four are really a consistent theme that we constantly address. And the reason being is you don't get one without affecting the other and you'll see as our discussion goes how they play together.

Dr. Reddick:

So just a little bit of insight as to who EPRI is, it's an independent entity and that is we do receive resources from electric utilities. But we also have physical resources that come from government and as a 501(c) not for-profit organization. Our interest is the public and our objective is to unveil if you wish about facts about how things work. And that's what Allen and I would try to share with you tonight. One of those facts, so those that have to make decisions whether it's a CEO, a board or you, that you will have information available to address that. And we do things in a collaborative way, that is we work with collectives in order to get some consistency at our overall process.

Dr. Reddick:

Our agenda this slide here kind of summarizes some key elements of our agenda that we have at the institute. If you notice, the first two items on the left are all about the carbon issue. And the carbon issue can be addressed in two levels, one is how you produce electricity and two, how you use electricity. And Allen is really leading most of the institute's effort around this whole item of how you use electricity with least impact from a carbon standpoint. We have something called the low carbon resource initiative,

which is all about investigating options that can produce power but have minimal or no carbon present in the resources.

Dr. Reddick:

As we see more and more renewable energy among the electric system, renewable energy is kind of a tough act to work with because like conventional power plant, you actually have your hand on the throttle. You run the power up, you run the power down. When you work with renewables whether it's wind or solar as an example, what happens here is that someone else's controlling that throttle. It's mother nature and what this does is it increases the requirements to be able to keep the electric system running reliably. What we have to do is learn how to work with this new feature set. And the key thing is that historically, we build what we would call a stiff system. Wherever the electric load goes, we build power production and delivery facilities. However, what we need with these new resources is to make the system flexible. So a lot of things we're doing gives us additional degrees of freedom because at the end of the day, we have to balance. If that switch is going to turn the light on, then the system has got to be in balanced.

Dr. Reddick:

And last part of what we're doing here, we're about providing information and education about how these processes work. We're definitely not an advocacy type organization, we just call the facts the way we see them. So the principle that we are addressing is what we commonly refer to as the integrated energy network and what that is, it's a process of electric power production delivery and the application of communications technology. And we put this process together and the point I wanted to make, first of all, is it's all about you as the consumer. Notice the consumer is in the center of this diagram, so this entire process is built around it. It's all about providing... I kind of almost repeat those. It's affordable, it's good for the environment, it's reliable and it's resilient. It's all about taking a lot of different features and putting together.

Dr. Reddick:

Among the newest assets that've been added to the mix is renewable energy and because it does have a different set of properties, we're learning how to mix that with other things that we have. And then last and most importantly, is we're overlaying communications, we're adding computers, we're gathering data, all of that to help manage all of these assets in a very, very flexible manner. So let me point out a couple history items, I always think a study in history is vital because it gives us some clues about how we make the future better. Some things repeat and some things tell us we don't want to repeat. So that's why it's valuable to be understanding on how we got here.

Dr. Reddick:

Most people know the name of Thomas Edison, he's kind of the guy that got the whole show underway when he invented the light bulb. And what came shortly after that was we needed a system to power that light bulb. And he was a guy known as the guy that provided DC power. DC, it's kind of what you would see coming out of the battery, it's also what you see coming out of a solar cell by the way. It's a flat amount of power production. One of the problems with this is that you could only ship it on short distance and the reason being is if you try to ship it a long way, then there would be so many losses in the system that

it would chew up all your energy in just the shipping of it and you wouldn't have any to use it in. Along came a fellow name Nikola Tesla and he's the one that introduced the principle of alternating current.

Dr. Reddick:

Now, why is this important? Well, the issue of not being able to ship DC because of losses. The AC, as it's called, alternating current, is that solution because we introduced the device called a transformer. And a transformer is simply a device that maintains constant power to the device. However, what it does is it increases the voltage and reduces the current. And what does allows you to do that in very low current levels, which drives losses, it enables you to be able to ship power. There was quite a controversial award, you want to read some interesting things is they really went after one another. I mean, at the throat, literally. And spreading all kinds of misinformation, I want to emphasize that because we're trying to give you good information that's accurate. And in the end, Tesla won.

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Tom:

Just a couple other things of note is that, it was actually the early '20s when electricity really started to get its grip, and there were a couple of moves by the federal government really, really significant. That is that, when power was beginning to shift between states, then the federal government put regulation of that interstate power and how it'd be handled. Probably more significant, certainly from the standpoint in this company, is the impact of the Rural Electrification Act. That basically brought electricity to people at a scale and at remote distance in a very powerful way.

Tom:

To close out a little bit of this history lesson is that, as you can see, from the '30s to the '80s, the use of electricity just exploded in terms of where, who had touched, inventions that came along. What we see with so much of that was automated devices. NPPD was founded in 1970, but the last item just below that is a very important thing. PURPA, the Public Utility Regulatory Policy Act, it's amazing I actually spit the words out, government creates some interesting things, when that was forwarded in 1978, what that says, if you own an electric-producing device, you put a solar panel and you put up any kind of wind turbine, then what you have is a guaranteed market for your production. That is really, really powerful.

Tom:

These are some of the prior history rules and things that we're changing and very important from the standpoint of electricity. Let's just be sure that everybody understands how the whole electric process works when we roll it all together. I've stolen a lot of pieces out to you, so let's see if we can summarize it. I'd like to take this diagram to start at the end. That is item number six. Why don't I start with number six? That's you. This process is all about getting electricity to you. That's the important storyline.

Tom:

With that in mind, then let's go back to one. And that's where we produce electricity. We have a number of options, a couple slides here. I'll show you some of those options for producing electricity. The key thing, why don't we go AC? Because see that item number two, that substation is filled with transformers. That's where you step power up. You ship it and you go out over three, which is the transmission.

Tom:

Then, when you get to the end where you'd likely use it, item four is another substation filled with transformers, that then gets it down. Then in five, it's handed off to the local distribution. NPPD's responsibilities are all over one, two, three and four, and your local power company has a lot to do with item five. That's how the story fits together. These are just the light descriptors that go with each piece.

Tom:

Okay. Let's talk a little bit about how we produce electricity. Here's some examples of six types of power producing options that are out there. I like to divide these into two categories. Those that actually take the fuel and use it directly to produce electricity and those that actually take the fuel, go to an intermediate step, and then produce the electricity. The most common of those is, let's take the case where we're going to go through an intermediate step. Usually, that intermediate step is the formation of steam.

Tom:

When I look at these options up here, much of the natural gas, nuclear, and coal all go through that steam cycle that runs then a steam turbine that, in turn, turns a generator, produce electricity. Some natural gases actually run directly through a gas turbine. It can be either way. If I look at wind, solar, and hydro, these are all direct items in the sense that the wind turns the turbine blade, which in turn rotates the generator, and we get electricity. In the case of solar, we got special materials that when the sunlight strikes it, it produces electricity and we gather it. And hydro, waterwheel. We've been doing that one for a long time. I guess we used to grind old corn that way, too. But today, we largely make electricity with it.

Tom:

Also, all these facilities around the State of Nebraska have names. You notice in this graphic there are names identified for some of these as an example. I guess as I understand, both the name here for the coal plant and the hydro plant, that was here in this community. We're certainly very close. So, it's good to have a name. Let's don't make everything generic. I think to me that's an important part of identifying with it.

Tom:

What are these transmission systems and substations? What are those about? The transmission lines are the big towers with the big ladders. One thing about it, we could see them from quite a distance away. The reason being, they're like the interstate highways. That's the part that's shipping the big blocks of power. Again, when we get to the point where we want to be able to use it, then we have to be able to either step it up or step it down. And that's the role of the substation. What you'll notice if you pass any

major substation, a lot of wires concentrate a small area. You see a lot of buckets or cans. Those are really the transformers where that stepping up, stepping down occurs.

Tom:

These are the key parts in what we call the bulk system and how we move and use power. When we start getting down to the using level, we actually step the voltage down to a much lower value. That is what we understand to be the distribution system. The distribution system is where we as consumers get to be a part of the party.

Tom:

That's kind of a quick run through of the pieces. This is really our summary slide here, is that, if you look at this diagram on the left, we've got all of our major power producing assets. By the way, there are large wind turbine arrays and there are large solar arrays that can produce large blocks of power. They feed directly into the transmission system.

Tom:

In contrast, if you look at this diagram, on the right-hand side, that's all about the distribution world. And that is to protect these large resources on the left. We ship them to a point of use through the transmission system. We step it down and then we begin looking at distribution and use. There are a lot of things, bits and pieces, whether it's our homes or whether it's our businesses. But also, you might notice in the bottom of that right-hand side, you see a solar panel with some sun.

Tom:

That's because you could have a solar panel on your roof. Now, you're producing power down there, not just at the bulk level. Again, what makes that work? That PURPA Act, very crucial. Also, all these assets on the right-hand side, this is where one of the largest new roles for communication is involved. We can actually manage those resources. You may have heard the term smart grid or smart technology, smart thermostat. These are devices that use communications and computing technology to put all these pieces together.

Tom:

This is a really important slide here as well. We're always concerned when we're in something alone. And what I'd like to say to you is, you're not in this alone. NPPD is part of what is known as the Southwest Power Pool. The Southwest Power Pool is an aggregation. You can see it runs from North Texas all the way up to North Dakota and a little bit on each side of that and places in between. The reason being is that, this is a large pool of sharing of resources.

Tom:

Typically, that sharing is a lot about power generation, about power production. Why do you do this, is that, through sharing, usually, it reduces cost and it increases reliability. That's why to be in a shared pool, when you get into buying, you can actually reach to your neighbor for help. That makes this a very, very

valuable relationship. There are many power pools scattered around the country, all intended within that zone to work together. This principle of shared resources is very, very important.

Tom:

Okay. The last couple slides here to wrap this up. I want to go back and I want to really dwell on this principle here which is really important. We've got these four things and they're all connected. Allen is going to come in and tell you a little more about these, and how some of the things relate. But they're all connected. You change one, you change the other.

Tom:

At the end of the day, there are no free lunches. It's sharing. There are two things that really impact how these four play together. One is technology. As technology continues to improve, generally speaking, we can accomplish this mission at a lower cost, and we can do it more effectively. We can actually enhance reliability. We can enhance resiliency. We can do it in a way that we have very small impact on the environment. You'll keep hearing this thing repeatedly, and that's how part of the decision is made. That is, it is a balance. You tilt it. You have to live with it. So, I want to encourage you to get these four principles in your head.

Tom:

To close out, we'll talk just a little bit about the way the finances work around the electric industry. You can see a lot of nice words here. I'll pick on a few of these. But I like to refer to the principle which is known as the regulatory compact. Essentially, actually, it was in the early 1900s, the regulatory compact was put together under the following principle. It would take a monopoly like electric industry, and in exchange for guaranteed service and managed prices that all customers would be served.

Tom:

One of the examples I'd like to give is that, if we look at gasoline price, this is what happens when you have volatility with price. There are periods when the price rises very sharply. It's hard to plan a future when you have a lot of price variability. This notion of getting a stable price is really the principle of the regulating principle.

Tom:

What the regulator does is, it says the following in a very simple way. You must provide the capability, but we will allow you to recover your cost and make a fair rate of return on that. The regulator rules on that. How do you experience this? It comes through whatever electricity rate you're on. That electricity rate has a very, very important item. I think with that, I appreciate your attention.

Brad Kitchens:

Thank you, Tom.

Tom:

Thanks, Brad.

Brad Kitchens:

Once again, we'll hear from our second speaker and then we'd be happy to take questions or hear your comments. But we're going to do two quick polling questions. This is the first one. We're asking you on these three items that you've already heard us talk about a lot that really is central to today's discussion. If you had to rank them most important, second most important, and third most important, how would you rank these three.

Brad Kitchens:

Again, if you're in the website, if you just hover over each of those bars, you'll see an up and down arrow, so you can move those bars up and down through that arrow. If you're on texting, you're just going to have to put in a... You can't do it texting? You can only do that if you're pollev.com. Again, just hover over. You'll see the arrows up and down. But we're just curious. Before we talk more about these three times, and we will, if you had to rank them today, how would you rank them?

Brad Kitchens:

Give another 30 seconds, then we'll look at the results, and we'll keep rolling. Yeah, nearly 40, which is where we were last time. I keep looking back there. I forget it's right in front of me. Yeah, I think we're ready. That's all right. Nonetheless, the vast majority... by the way, last week, in our two settings, the same thing. Reliability overwhelmingly across now three of the five settings we're going to be talking to is the number one item.

Brad Kitchens:

In this setting, affordability and cost. I'll tell you one of the two last week. It was affordability and cost. And the other one, it was environmental impact, was the second. So, second and third, I think, are running neck and neck, but overwhelmingly, reliability is number one item from everybody we've heard from thus far.

Brad Kitchens:

With that, we'll continue to press on these topics. But let me go ahead and introduce our second speaker. Allen Dennis is going to talk to us now a little bit more about business... I have one more. I keep forgetting this. I know. My bad. I did this last week. Kept forgetting the second question. Is it up there?

Brad Kitchens:

We're just looking for one word. We're going to put up a word cloud. The word cloud is going to be, when you hear the word decarbonization, you had to just type in one word, what would it be? Excited, dreadful? Good, bad? Expensive, cheap? Like it, don't? What would your one word be? We'll just see what the... we

have multiple people that put in one word. It will be the larger word in the word cloud. So, it correlates with the size of the words we'll see here in just a moment.

Brad Kitchens:

That works too. Somebody said that last week, actually. They've referenced the soft drink. There's 45. Whenever you have a chance, Jen. 48, 50, wow. This takes a second to process. Again, all the words that were selected, you'll see on the word cloud, knows that were selected multiple times, will be the larger words that you'll see here in just a moment.

Brad Kitchens:

If anybody use bad words, she screened those out right now. Apparently, we have a lot of those because this is taking a little longer than it has in other setting. I thought you could sneak that in. All right. It looks like many think it would be expensive would be a good way to describe one word for carbon. Necessary is a pretty often use word. So, that would be on the other side of the coin. Unreliable. Again, you can see the other words selected there, communism.

Brad Kitchens:

Bad, Texas tree, subsidy, maleficence. Anyway, good choice of words. But overwhelmingly, in this group, anyway, expensive. We'll see. Again, we'll do more polling and we'll hear your comments. But that one jumps out, literally. With that, let's go to our second speaker.

Brad Kitchens:

Allen Dennis, also with EPRI, is going to talk to us about business risk, on topic now, about with carbon and decarbonization, focusing on cost, reliability, and environmental impacts. Allen is the Senior Program Manager at EPRI. He started and leads the electrification program at EPRI. That's a pretty big deal, as you might imagine. He has 40 years of industry experience. He wasn't with us last week, so I'm eager to hear, Allen, what you have to say. Thank you, Sir. It's all yours. There you go.

Allen Dennis:

Thanks, Brad. Okay.

Brad Kitchens:

On session five, I'll remember too. Yeah, I'll get it right in session five.

Male:

Okay. Try it now.

Allen Dennis:

Got it? We're on. That's power. Again, Allen Dennis. I run the electrification program at EPRI, worked with utilities all across the nation, started expanding a bit more internationally in what we're doing. I'm really here to talk about five things and build on an excellent overview that Tom has given us. The five things I want to really dive into here are really an understanding of how the industry is changing. It is transforming in a rapid pace, unbelievable pace.

Allen Dennis:

We hear all these different terms around decarbonization, net carbon zero. Every day, more and more terms. So, I want to help benchmark those a little bit, give you an understanding, a broad understanding of what some of those terms are. Then, policies. Things are happening quickly both on regulatory environment, businesses. A lot of areas are changing this industry that you may not quite think about as we go through this. What are some of the potential risks around decarbonization? I want to touch on those. We'll get into a little bit around NPPD and specifics around NPPD's generation.

Allen Dennis:

First four areas we get into. Again, I'll dive down into each one of these, so a little bit more here in a minute. But you have the energy supply. Right? Tom covered that. How the systems are integrated together, complex. How the community and environment is becoming more and more of a focus in a lot of areas, and then how this economy-wide decarbonization then may impact areas within organizations.

Allen Dennis:

First, with an energy supply. We look at, everyone, how do you want to... ultimately, how do you ensure you have low cost supply. Right? I mean keep the rates down. Utilities including NPPD go through an enormous process to figure out how you can get the lowest cost access to energy, along with regional mix. What's your transmission in the area? It's different depending on where you live and where you're located throughout the US.

Allen Dennis:

Then, how societal priorities are changing. You've probably even seen this in the last five to 10 years. It's becoming more of the forefront. I've seen it just in my short timeframe here of looking at the electrification piece. It has radically changed over the last five years and it is going at lightning speed, as I mentioned earlier.

Allen Dennis:

What's happened in the US? If we look what's happened from 2004 to 2019, your 15 years, you've seen a dramatic reduction in coal. A lot of coal plants have closed, or they're in the process of closing in the US. Natural gas, it's been increasing. Even the gas industry calls themselves kind of that transitional fuel. Nuclear, about constant. Hydro, constant. Wind is really taking off. Right? You've seen a dramatic increase in wind. Solar, although it's not a large percentage of the total, if you look at where solar has started, even 10 years ago, it's a dramatic increase. The others have basically remained constant.

Allen Dennis:

If you look at what the percent is then of these different generation mix, and again, this is the US, you can see how in 2004, and let's just take coal, for example, has gone from a generation mix in the US of about 50%. It's now 23%. You look and see how natural gas has gone from about 18% up to 36 or 38%. I need glasses. Those are the two primary ones, the two major ones that you've seen happened.

Allen Dennis:

Certainly, you've seen wind going from literally nothing, 2004, to 7%. It becomes more and more focused around this. But again, as Tom mentioned, you don't get something for nothing. You have to look at the reliability. You have to look at other aspects. Each one of these generation sources has benefits and has some issues associated with it. And that's the balancing that folks have to do every day in the utility industry.

Allen Dennis:

Where is NPPD? Just quickly, I should have hit the summary slide. Coal down, gas up, nuclear constant, wind and solar up. If you look at the carbon-free resources, and again we'll get into a little bit more of the definition of that here in a minute, you can see that in 2005, NPPD was about 30% carbon-free. If you look in 2020, significant impact, 45%. To move 15% in 15 years is pretty tough to do.

Allen Dennis:

You look at a lot of things on what people are doing around this carbon-free, and it's an area that a lot of folks have focused on, and around decarbonization and what's happening. When you look at the generation mix, again, you see, as you've heard in the news, a lot of renewables are coming in more in place, and some of the carbon impacts or the carbon fossil fuel have been a bit reduced.

Allen Dennis:

The second area I want to get into is the integrated systems. As you start looking at a system, and people, historically, you've looked at these systems and you say, as Tom mentioned, you produce the power, you distribute the power, the end use customer uses the power. It's efficient. It's reliable, for the most part. Certainly have occasions when folks run into, potentially, some issues.

Allen Dennis:

It's flexibility and security that you want to see. It's not only providing different options, but as we start getting more interoperability and you get more web-based applications, our organizations and a lot of utilities spend a lot of time and a lot of money around security of the system, and certainly growing customer engagement. Again, give you some examples of that here in a minute.

Allen Dennis:

The challenge of modernizing the system is complex. You're getting more and more options out there. You have an electric vehicle, right? We've done research and we started this five years ago, right? How does an electric vehicle go the other direction? Right? You charge it, but can you release it back and maybe operate your home? Now, all of a sudden, you think, "Wow, during the peak time, if I'm needing some power or it's expensive, maybe my car can then charge my home." Right?

Allen Dennis:

Your car is like a little generating station once it's charged up. Right? Now, think of all those different things that could happen. And it gets complex quickly, on how you want to optimize it, because each circuit has a different loading, each line has a different loading, how all those mix and match. It gets really tough quickly. To understand all of that requires a great knowledge of not only the utility system, right? But now, you have to understand what the customer has.

Allen Dennis:

Historically, when I first started in the business 40-some years ago, you kind of knew what the customer had, but you were serving the load. Right? There wasn't a lot of change. There wasn't a lot of, "I'm going to utilize this system a little bit, but not a lot, on benefiting on the system." Now, that's becoming more and more important as utilities operate those systems. What I call bidirectional flow, solar even, right? You look at solar and how you can use solar when there's an outage.

Allen Dennis:

Along with that, it starts blowing your mind, is when you start having an electric line, and let's say someone cuts it. Right? They build a new home. They cut the electric line. Right? How can the grid self-heal? How can it stay operating automatically? Now, you're starting to get a grid that starts thinking on its own of how to optimize service. Again, incredibly complex. And it's exciting. It's very exciting. All the new technologies we look at, it's really, really cool, I think, of what's happening there. That's how it has challenges.

Allen Dennis:

Along with that challenge is you start seeing that more communities are involved. How does everyone participate if you're going to start decarbonizing? You look at that and we certainly look at this from our organization. How do you look at it from an air standpoint, from a land standpoint, from a water standpoint? It's leveraging a lot more resources than historically folks have really looked at. Then, public health and safety. How do you then build this into it? And the whole idea around environmental equity and environmental justice. Where do you locate these facilities? What's the environmental aspects around those different areas? All of these are being discussed and worked out in many different areas.

Allen Dennis:

When we look at economy, why decarbonization? Have we just started it recently? No. It's been going on for a long time. It's just been at a little different focus. Historically, around energy efficiency, and again, I worked for a utility in the mid '80s and we were doing energy efficiency measures in Colorado, is where I

started in 1984. We had programs around lighting and those kinds of things. It's not something new. A lot of folks have done it.

Allen Dennis:

You look at smart thermostats, right? They can now tell your behavior, when you're up, when you're not, how it turns it down, automatically. I know one person that that thermostat wasn't really responding well to them. So, they were like backwards and it was a mess. Anyway, they got it worked-

PART 2 OF 6 ENDS [01:02:04]

Allen Dennis:

... were backwards and it was a mess. Anyway, they got it worked out. And then how do you then do more control around your systems? Your air conditioning systems, your heating systems. All of those have been going on again around energy efficiency. And then from a supply standpoint, how do you look at cleaner power? Wind, solar, nuclear certainly fits in that. How do you look at maybe even some natural gas plants have been as we've shown on the graph before?

Allen Dennis:

So really, what folks are looking at and starting to look at, and we certainly have been doing this at EPRI is some of the newer technologies. We mentioned cars, right? But there's a lot of off-road vehicles. You look at forklifts and we do a lot with airport ground transportation and ports and those kinds of things. And you look at heat pump technologies, man, that's just really getting very exciting around heat pumps.

Allen Dennis:

Heat pump water heaters and what's happening in that area. There's a lot happening around the end use technologies and what people actually utilized. So again, a whole area that was targeted. And then to even no make it more complicated, we've talked about natural gas but now there's other fuels. Do you use hydrogen, do you use ammonia, do you use other potential fuels around operating some of these end use technologies? So all of this then leads to again, how do you optimize the cost, the benefit?

Allen Dennis:

What are some of those barriers that you have to get through around each of these? So let's go through some terms. 100% renewable. So we've heard the term 100% renewable. It's basically what it sounds like. Is that your power's generated from... Excuse me. Just grab a drink here. It's basically generated from solar, wind, hydro. But solar doesn't run all the time. So typically you're seeing some battery backup. So you may store that energy in some batteries.

Allen Dennis:

And then along with that you're looking at maybe even some hydrogen or some other applications. But it's 100% renewable. That power wasn't used or generated from some fossil fuel basis. Then you have

carbon free in essentially renewables and you're now adding in nuclear on top of this carbon free is the power that's generated. And the one that you're probably going to hear a lot more of if you haven't already is net carbon zero. Have folks heard that net carbon zero around? A few folks.

Allen Dennis:

So what that means basically is that let's say you're an industrial plant and you use natural gas in your process. You're heating up a boiler and you're using natural gas. And you look at all the different things that you're using the fossil fuel for in your operation and you say, "Now, I want to get net carbon zero. What can I do?" Well, you can look at those things. Maybe iron conversion. I'm saying, "Okay, maybe I have a fleet of vans that run on gasoline and I'll convert those to electric vans."

Allen Dennis:

So I can see a carbon reduction with that. So eventually, what you have is a balancing between how much carbon you're utilizing and then what measures you've done to reduce that carbon. Some folks have contributed to acreages in some forests somewhere. There's a whole different range of things folks have done around getting to net carbon zero. You'll see more and more businesses are driving to net carbon zero as a goal. Typically, you're seeing that there's a benchmark here. So you have to set a level.

Allen Dennis:

You say, "Okay, I'm going to look and see how much carbon I used in the year 2015. I'm going to go through all my operations..." Again, you can go through the math of it and you can say, "I used so many tons of carbon in 2015. I want to be net carbon zero by the year 2050. What do I need to do to get to net carbon zero?" You may say, "Okay, that makes sense, it's happening." California, building a new house, you have to be net carbon zero.

Allen Dennis:

How do you get there? Put solar on the house, most of everything's electric. By the way, code is that you have a plug for your electric vehicle coming into your house. So you have codes and standards, you have other things around solar and it's becoming more and more of a forefront. So people will go, "Oh, it's California." I came from a utility in Kansas City and like yeah, okay, it's California, right? But some of that translates across.

Allen Dennis:

You're seeing New York and some other states driving to net carbon zero. So it's not as abstract as what you may think out there. It's happening in communities today. So, when you look at what's happening around the world and you say, "All right, how is this really going to affect us and different utilities?" Many countries are establishing carbon emissions. So they're setting that benchmark. Their way of potentially doing that or putting a [inaudible 01:08:07] or a stick is you're actually coming up with a price per ton for carbon.

Allen Dennis:

So if you use so many tons of carbon, you're going to have a tax. And then the Paris agreement was really driving how carbon is calculated, how it's tracked, how it's recorded. If you throw the two degree C goal, two and a half degree C goal of the Paris accord, there's a whole elaborate environmental model around how do you establish this. So my only point in saying that is that people are working on this every day around setting those levels.

Allen Dennis:

Even in the US there's a couple areas, certainly in California and the Northeast that are starting to set a price per ton of carbon. Is it good? Is it bad? It is what it is. I'm not here to tell you which is right or which is wrong. That's part of this opening meaning and [inaudible 01:09:03] is how do you get input around it? Because everything has a cost to it. You don't get something for nothing. So it's just where is different communities at. Again, there's many utilities I work with and many communities I work with. Everyone's a little different.

Allen Dennis:

Everyone wants the little drivers. I would even say within Nebraska potentially the communities are different. So it's how do you then get in stride and move that forward? So what's happening with companies, 90% of the standard in most 500 companies have published sustainability reports. They're getting serious about this. So, that's up from 20% in 2011. You look at the fortune 500 companies, 163 have formal climate targets. In other words, how are they going to reduce their carbon?

Allen Dennis:

Put in out there for people to look at. Hard numbers. You start looking at countries around the fortune 500 are 23 companies. You say, "It doesn't matter." Six of the top 10 largest customers utility that was served in and around Kansas City had a European headquarters. They were focused on carbon 10 years ago, 15 years ago in some cases. So those are things that you have to look at. Many multinational companies are needing green energy to hit their targets.

Allen Dennis:

So again, it's not right, it's not wrong, it's just this is what's happening to help educate you around what some areas are saying. So what's the evolution? As we showed you before, we have 2005, about 30%. You look at 2020 it's about 45%. What's the future? That's the input and the discussion we're having today. In just leaving you also with the slide that Tom came up with here and was reviewing with you, it's that balance. It's the balance between reliability.

Allen Dennis:

It's the balance between affordability. The resiliency of the system and the sustainability. It's all of those things put together. Again, there's pushes and pulls with each of those. It's important it's a conversation. It's how people focus on it. So again, it's the balance, it's the trade off and how in each one and what that focus is. So with that, I'll turn it back over to Brad.

Brad:

All right. Adam, thank you. Two more important questions. I don't forget. So based on what you've heard, what concerns you most about decarbonization? So A, the risks of doing nothing at all, B, the risks of not knowing how we're going to get there or C, not really too concerned. If you had to pick one of those three, which would you pick? Can't be zero. They're coming through? Okay. Wasn't registering here. Yeah, we're going to do that again.

Brad:

Wow, that's different than the other ones. I can't remember exactly what the other ones were but I don't think we've had a leader that was, I'm not concerned about decarbonization. So again, going through your comments in just a minute so please elaborate. We'd love to hear the thinking behind that response. One other quick poll. So in your opinion, NPPD, whether it's the progress it's made on diversifying its energy mix that we saw mentioned in just a minute, how would you describe it?

Brad:

Too ambitious, doing more than enough but not too ambitious, overall pretty good, about the right pace, not quite doing enough, way behind the pace or you just don't know at this stage? I'm guessing based on what we're seeing so far it's going to be an A or a B. But let's go ahead and see the results when you have a chance. A and a B. So about two thirds, over two thirds feel pretty strongly that current progress is either too ambitious or slightly more than needed.

Brad:

One interesting fact, many of you, I know are in the industry or familiar with the industry. But I think it's up on the topic of decarbonization. When you just look at the entire industry, the utilities sector peaked in 2007 in terms of carbon CO2 emissions at about 2,500 million tons. It was the number one emitter of CO2 in 2007. Then with the recession in '08 and '09 loads went way down and emissions went way down.

Brad:

Even with the tremendous growth seen through present time, because of all the activities and controls and measures taken by the utilities sector, it has reduced its carbon emissions from 2007 to current day. Down to less than 1,500 million tons. So greater than a 40% reduction. You saw NPPD is about 45%. Transportation now is the number one CO2 emitter in the United States, it's no longer the utilities sector. So it's transportation, it's utility sector, it's other industry and then it's generally other other.

Brad:

So tremendous progress that is to say that we've made in this industry over the past 13 or 14 years. The trend line continues for many of the reasons that we just heard. A lot of conversion from coal to gas has contributed to that. The growth in renewables has contributed to that. One other interesting factoid that

I like to share with folks, when you look at renewable development in the United States, currently, overall the total capacity for generation in the United States is about 1.2 million megawatts.

Brad:

So a 1,200 gigawatt [inaudible 01:16:05]. About 120,000 megawatts roughly is solar today. About 120,000 megawatts is wind today. Both are expected to roughly double by 2026, over the next five years. So combined, they make up about 250 gigawatts or 250,000 megawatts. We're expected to be double that, roughly, using our department of energy estimates, in the next five years. And then double again in the 10 years after that. So by 2035.

Brad:

So they could be as many as a million megawatts, I have to get my gigawatts and megawatts combined, in the year 2035 by DOE estimates. Now, of course, energy output is way less than that because capacity factors are way less than that. But that's the kind of growth that's expected when we talk about renewables. Not talking about the NPPD service territory but nationwide. So just something to think about as we further talk today.

Brad:

We have about 20 to 30 minutes, call it 20, for the first set of comments. So please, anybody that has a question or a comment, our request is, please go to a mic, please provide your name, your city and your power provider just so we understand where you're coming from. Brevity is appreciated. With that sir, it's all yours.

### 3.3.0 Public Comments

Mike Groene:

I'm State Senator Mike Groene, I represent Lincoln County. If you don't understand that poll, we're the largest classification railroad in the world and we haul coal. We were about the 35th or 40th in the United States with settling power plant or a burning power plant. Most efficient one in the United States also. So you can understand the poll. I heard about affordability. It's not affordable.

Mike Groene:

We all know it survives on our taxpayer subsidies. That's why it takes first demand and the first place in the power pools, because it's low cost due to subsidies. That's not long-term because the windmills themselves are not reliable and long-term and they take a lot of carbon to build. We all know that. It's not reliable. Last winter's freeze told us that. There's a power plant 20 miles from here. Cooper kept 14 states lit and in heat.

Mike Groene:

He kept the power pool because Nebraska did not go wind. I also have a concern about a question I'd like answered sometime. The regional, it came in a little late. It's not a matter, we're doing it. We're going to do decarbonization. When was that decision made by the board? Another thing I heard about risk, I was waiting for the risk, what's the risk? Is the risk Bayou's EPA? Is that the risk you're talking about or what? The free market?

Mike Groene:

We have a public power district. Our concern is serving the members of that district. We do not create a lot to sell in the free market. So as long as we have low cost here, we weren't the cheapest forum from NPPD to offer us. You never talked about economic factors. That meltdown last year. I can't buy plastic in the industry right now because we can't get resin. All because of the Texas freeze. Because of wind but also because of natural gas pipelines freezing up.

Brad:

Correct.

Mike Groene:

Some of us are looking long-term for our citizens too. We are burning up the one most reliable source of heat in our homes, natural gas, for future generations. Because it is not going to last forever either. And when we have 300 years of coal available, we look at the long-term economics of our children's survival too and heat in their homes. There's a lot of factors in here I haven't heard. Locally, gentlemen as I said, that's a big economic driver for this county.

Mike Groene:

But I haven't heard anything from NPPD why. Do you believe the theory, the global warming theory? We all understand the globe warms and it cools then it warms throughout history. But is that the driving force? Is that the risk? You didn't say that, did you? So why are we decarbonizing our power outage? That's the question people want to know. Because of the theory? China is putting more coal power plants and faster than you can shut them down.

Brad:

Agreed.

Mike Groene:

They've created more, in one year, than what you said we went from 2,500 to 1,500 in one-year emissions of tons. So, a couple things I'd like you guys to look at, the NPPD to look at, when NPPD shut down Fort Calhoun to take that over, to modernize it and put it into our mix, it's costing NPPD millions to shut that down. As much as it would to build one. Why haven't we looked at that and put it into our grid? Another one last year we passed LB650 geological storage of carbon dioxide. I'm on the natural resource committee.

Mike Groene:

We happen to sit out here sitting right on top the right rock formation to do that which is to pump it into the ground. Dig a well and pump the carbon dioxide into a well. I asked a simple question. We're burying two atoms of oxygen and one of carbon, are we going to run out of oxygen if we start burying it? That was a joke. But that's the science I hear. So anyway, I want some answers and I want some of the people on this board, the selected board to answer what did they vote. Few of them are up for election.

Mike Groene:

We need no advance. Our member is up for election. What's your reasoning? Some guy stands up here and says, "It's a done deal. We're going to decarbonize." I haven't heard that. I haven't heard from the owners that they want to do that. And that's the people of Nebraska. So that's my concern. Tell us what you want to do. We might turn around and tell you what we're going to do. Some of you won't be on the board next year.

Brad:

Yes sir. We'll let you go after this gentleman.

Ronald Jones:

Thank you. My name is Ronald Jones. I live in North Platte so I get my electricity from municipal light and water. First of all I disagree with Senator Groene on many aspects. I was a railroader for 42 years. I do know, for a fact that in 1973... I hired out in 1970. I can tell you that our coal usage increased dramatically starting in 1973, and that's the coal plants. Railroad was here a hell of a lot longer than 1973.

Ronald Jones:

It's trucks running up and down this interstate that the railroad can compete with Mr. Groene. That's not the right story. I want to thank NPPD greatly for what you're doing. We as a community do not know how efficient or how lucky we are to have Nebraska Public Power. Do you people realize that we produce more electricity than we use? Is that not true sir? And that is sold on the open market, what we don't use, is that correct sir? That's a fact.

Ronald Jones:

So when Texas, who had their head up their ass, and didn't pay the money that we have already paid to winterize our system folks, we Nebraska, thanks to Mr. Kent, saved some lives in Texas, because they did not winterize their electric grid. I'd like to ask, Mr. Kent, how much money did NPPD make selling Texas and the Southwest Power Pool? How much money did we earn when they dropped out of that when their grid about collapsed? We made a shit ton, did we not? Can you give me those figures sir? I think these people need to know how good you are.

Tom Kent:

I might as well answer it quick. Yeah, I'm going to come up after the break and we'll talk about some of this in more detail. Thank you for the nice complements. One clarifying thing, a part of Texas that was the big issue that everyone talks about, they about blacked out, down for weeks and months, they are their own separate grid, Orcutt. So, while we are part of the Southwest Power Pool, there are very limited interconnections just like a straw between us and Orcutt. So there's not a lot of energy that goes back and forth.

Tom Kent:

The 14 state region that we're part of is part of what is called the Eastern Interconnect, which is the big, giant, largest machine in the world interconnected from the Western border Nebraska to the East Coast. That's what we are part of, Texas is separate. So yes we did make a lot of money, in the order of, \$100 million in that two days because our power plants ran well which had very little to do with me and a heck of a lot to do with a lot of the people in the room here tonight. So thank you for them and for our crews that keep the lights on. But we were able to ensure that our plants were running to do our part to serve the Eastern Interconnect during that storm.

Ronald Jones:

100 million.

Tom Kent:

Ground numbers.

Ronald Jones:

That's a lot of money.

Tom Kent:

It is.

Ronald Jones:

You made quite a bit of money for everybody in this room as I understand it, so thank you. Now, I'd like to address the idea of doing the same thing and not moving forward. Think about this Senator Groene, your predecessors in this state, your ancestors did a hell of a thing when they came along and put in [McConaughey 01:27:03] in the whole canal system and all the lakes, it was on their back, that that whole plant sat there sir.

Ronald Jones:

And I am sure that they did not want to pay for that progress. If we stick our heads in the sand, and don't want to progress, we're going to die. Shake your head. You have to progress. You're going to see more

electric vehicles. How are we going to deal with this? It's coming. And if it's free energy, if you get free energy from the wind, the solar, doesn't cost anything but, okay, you have your opinion I have mine. But think about the 100 million before you throw these people under the bus. And I would like to applaud you. Thank you.

Brad:

This gentleman coming up.

Ralph Holsfaster:

Okay, I have a couple of questions for the ethnic people and maybe they can address that before it's over but, I really don't understand carbonization. I don't know if it's made from CO2 or methane gas or if air is absorbed and they call it decarbonization. Well I would like them to explain what that is. They talk about carbon sequestering, what that causes. And I know that in Nebraska [inaudible 01:28:42] 130 acres of soy beans and 130 acres of [inaudible 01:28:47] corn, how much CO2 and methane does that use?

Ralph Holsfaster:

A lot of people say in that case we use water out of the atmosphere to grow our plants when there's carbon. And I also would like to make a comment on what that gentleman just said here. That I was on [inaudible 01:29:09] for 24 years. And I was here when Gerald Gentleman was put up. Gerald Gentleman was the star for NPPD I think. That was the most efficient coal farming plants in the United States that time. I couldn't find a record beyond that. But I think [inaudible 01:29:32] under Gerald Gentleman was good.

Ralph Holsfaster:

And with the technology we've got around here, you'd think the world 25, 30 years ago [inaudible 01:29:42] population withdrawal because we didn't think we'd have food. Now we've [inaudible 01:29:51]. But I was really concerned about... I know from being on the board and the experience I got off of the board, that wind power is the most expensive electricity you have. I think, it's pretty much the most expensive because of all the stuff that has to go in once we get that windmill up there. Connecting wires to it, you got to have power plants to support.

Ralph Holsfaster:

When the wind isn't blowing so your lights go out. It's the same as the solar. I think innovation in the end, they're talking about drilling some holes and putting... I'm involved at the [inaudible 01:30:30]. They're going to punch down some holes I think. NPPD has been logged in with [inaudible 01:30:41]. I think they'll probably back that up by putting some underground gas that they produce by drilling in a hole. There's a lot of different things we can do if we don't just say, "We're going to have electric cars." And the other thing I want to know, if electric cars do [inaudible 01:30:59].

Brad:

So your first question is about decarbonization. Just in a nutshell is what's it all about. Is that correct?

Ralph Holsfaster:

Yeah. I just really don't understand what decarbonization is and what we're going to do if we decarbonize everything.

Brad:

Did you provide [crosstalk 01:31:18] your name? Could your put your name, I'm sorry, your name and-

Speaker 4:

Your name sir [crosstalk 01:31:27].

Brad:

Your name please.

Ralph Holsfaster:

Rob [Ralph Holsfaster 01:31:30].

Brad:

Ralph Holsfaster.

Speaker 4:

Holsfaster.

Brad:

Thank you sir. Tom, do you want to just take a quick crack at the... Or-

Allan:

Allan.

Brad:

Allan.

Allan:

So the-

Brad:

[inaudible 01:31:44] stand up.

Allan:

All right, thank you for saying that. So, first of all, for decarbonization, when we're actually looking at which resources can we select that in the process of producing electricity, carbon is just not a part of the equation. The science, which we didn't come in here to debate, there's a lot of science that indicates that carbon is aggravating our weather conditions where we've moved into these extreme periods.

Allan:

Now, one of the things that I've certainly looked at from history, you heard me, now let's go to the history item, is that it's not like we haven't had variability before, but one of the things is very clear, is variability is becoming larger. I'll give you a really simple example. One of the things that you may notice is we get now some periods of very, very intense rain. The reason that we see these periods of intensity is that when the air gets warmer, it can hold more water. So what happens is that-

PART 3 OF 6 ENDS [01:33:04]

Tom Kent:

It can hold more water. So what happens is that water is slowly sucked up and held for a longer period. And when it releases, the opportunity for large volume occurs. There's a lot of underlying just basic science, it supports that position. However, and Alan really closed out with what we still argue as being the most important thing. From our standpoint, we look at those four items, reliability, resiliency, the price that we have to pay for electricity and what that environmental impact is, and we really try to balance that entire family. There's an old adage, and I've actually tested this, when we get introduced to a new idea, it takes 30 to 40 years for that new idea to become a part of our system. And we've had changes through history where what we do or make these long-term and gradual transitions, it's interesting that timeline that I showed where certain items begin to make serious changes, remember electricity even though it came in the teens, 1915, around that period, it was well into the '20s before it really started to get adopted large scale. But it took almost 40 years for it to become the fuel of choice, electricity.

Tom Kent:

So I think what you will see is a gradual transition. I really appreciate the expressions of concern that we've seen at the other two stops as well as here. NPPD, their goal is to hear your thoughts on this balanced with what we know about some science principles. And it's not just [NPPD 01:35:09] doing it, there are others. Let me give you one number to think about. So worldwide, the total carbon emissions annually is... I believe that number is 36 gigatons. I think that's the number. How much of that 36 comes from the United States? It's about five and a half. Five and a half of the 36. I believe those numbers are correct. So the truth of the matter is the rest of the world, because it is a world, and we're all contributing our part...

So many people ask why should the US take the step to reduce. The bad news is we have to live with the entire world, not just ourselves. And the general view is that we probably have the intellectual ability to show the rest of the world how they're going to solve their problem that we're all facing together.

Tom Kent:

Alan?

Alan:

Just briefly.

Tom Kent:

We have some other comments, so briefly.

Alan:

Just to add on to what Tom said. So de-carbonization, so you go home, you fill up your gas tank, right, gasoline, and gasoline is basically carbon and hydrogen atoms. You drive 100 miles. You go back and you say, "Okay, I want to reduce my carbon. I'm going to go buy an electric vehicle, and I'm going to put some solar panels on my house, and I'm going to charge my car right off of the solar panels." You didn't use carbon. You used the sun to produce the electricity that went into the battery of the car. So now, you drive 100 miles, you didn't use any carbon. Where you used it when you used gasoline, when you charged it with solar panel, your car for that 100 miles, you didn't use carbon. That's de-carbonization.

Speaker 5:

[inaudible 01:37:23].

Alan:

Thank you. Yes ma'am, I saw a lot of corn fields, so... please.

Speaker 5:

Well, it's the cheapest-

Speaker 6:

Let's go ahead and listen to some other comments, please.

Melanie Kaufmann:

Melanie Kaufmann from Halsey. I'm in Thomas County. My electric provider is Custer Public Power. I guess I have a couple of questions. The money that Tom Kent got from the blackouts from Texas, I want to know

what the carbon emissions, what's that going to cost me as a rural agricultural Nebraskan. You're talking about doubling or more wind turbines, not windmills, wind turbines and solar. And along with that goes all the substations and all the feeder lines. I know that very well because Custer Public Power upgraded the line in the substation right next to my house, right across the fence. I tried five years for them to relocate that to no avail. In the building of this upgrade, Rick Nelson, the CEO said I as a consumer would not be affected whatsoever as a consumer as far as when it comes to my bills. But what have they done to me and my viewshed there at home, that house, they've ruined the value of my house with the upgrades and the lines that they have put in.

Melanie Kaufmann:

What is this going to cost rural Nebraskans in agriculture? You're taking more of our ground out of production. We feed America. We raise the best beef in the world. Thank you, Senator Groene.

Brad Kitchens:

Thank you very much. We'll let NPPD again answer the questions after the next segment. So your questions and comments are welcome, but just we'll let Tom reserve the speaking role here just for a few minutes. But I see a couple of more gentlemen heading to the mike.

Larry Lindstrom:

I'm Larry Lindstrom from North Platte. My provider is Municipal Light and Power, North Platte. I've been reading a book. It's called Unsettled by Stephen E. Koonin. He was a scientist for Obama. And he finally quit because he didn't like what the news media and everything was twisting everything around. So in the book, he says follow the data. And it's not one year, two years, three years, it's hundreds of years that our climate changes. I mean, every so along, it changes. We know the Corn Belt that go on north for a long time ever since I was a kid. But anyway, that's a good book. I guess I wasn't a very good reader of that type of literature, but just read that book. He'll open your eyes.

Larry Lindstrom:

Gerald Gentleman Station is a very important part for this area. And we have a lot of employees up there. I think we're about 250 or something like that. I don't know how much we got. But I think I know Gentleman Station and NPPD have been working for years trying to figure out uses for carbon. I know they were in a study up in North Dakota for carbon capture sequestration. Down east, we landed Monolith, a carbon black company. We were going to use the byproduct to make it carbon black to run Gentleman Station. It fell through. They decided to use the hydrogen to make fertilizer. I know they've been looking at CO<sub>2</sub> up here at Gentleman. There's got to be other uses for that carbon.

Larry Lindstrom:

So my opinion is that it's fine to do all these studies, try to figure out where we might be going, but I would not set a date when we had to do this. The industry is changing. Technology is changing. And I think there's other things that we can do and maintain our mix. Now, I don't know for sure what the total is, but if you read the 2020 report, we were over 60% carbon free on the generation. And in 2019, we were 65% carbon

free. And I understand that we're going to be going out for bids for new wind farms for 2 billion megawatt hour for Monolith. Near as I can tell, that will boost our amount probably about 10% more, so maybe we're going to be at 75% carbon free. So anyway, I think we should just take it easy, do our work, and not set any date when we're going to try to go carbon or.

Brad Kitchens:

Thank you, sir. Appreciate that. Again, the numbers that we put on the pie charts, your numbers may be right. It describes a different way, but I think it's 45% carbon free or that was the reduction.

Larry Lindstrom:

I guess [inaudible 01:44:16] book right here.

Brad Kitchens:

Okay. Again, you may be right. Yes, sir. Oh, I'm sorry.

Dan Scheer:

My name is Dan Scheer. I'm President of the board of Howard Greeley Rural Public Power District in Saint Paul. And I guess with piquing thoughts about the February blackouts that we had pretty much because of lack of generation because of all different concerns, but we didn't have enough generation to cover the load. That's why we had the blackouts. I brought along my 90-year-old mother with me today. She still lives at home...

Brad Kitchens:

Welcome.

Dan Scheer:

... by herself. In the summer, she needs air conditioning; and in the winter, she needs her heat. So rolling blackouts are just not... they're pretty scary. I know there's some of the board members that would probably say, well, if she had a son that was worth a darn, he'd buy her a generator. But you know, my mom already owns a generator. It's called Gerald Gentleman. She's a customer of this state that owns Gerald Gentleman, and the customers own it. Not the people in California that want us to close it, not the people in New York that want us to close it, not the people in Lincoln that want to close it because they aren't even customers of NPPD. The people in this room are the customers. They own that power plant. They should have the decision on whether it's closed or not. And most of all, these meetings that you've had so far, I think the majority is saying, "No, we're not worried about de-carbonization. We're worried about reliability." And so that's where I stand.

Brad Kitchens:

All right. Thank you so much.

Matt Kibbon:

Good evening. Matt Kibbon, City Administrator, City of North Platte. First, I'd like to... and most of these questions will be directed to Mr. Kent, so I hope he's taking notes. First, I'd like to applaud the carbon reduction outlined in the slides. I think that's really impressive. The big thing that impresses me there is the lack of change in the generation mix at NPPD. We still have 42% of our generation coming from coal if I read the slide correctly. I am concerned about the decommissioning cost. And I think there needs to be a public discussion on the decommissioning cost of wind turbines and solar power. I know that's coming down the pipeline. In the SPP, I'm curious as to how NPPD compares to their peers throughout the market with respect to generation. So how much electricity gets generated in Nebraska and then do we distribute out to others within the SPP market, if that question is clear enough?

Matt Kibbon:

Next is what's the largest generating station in Nebraska. If decommissioned, how many wind turbines would have to be built to replace it? And then finally, Mr. Kent, if you could explain when it's your turn here, if you could explain how we were able to make 100 million dollars during the rolling blackouts. I think that's important for this group to understand, because if I understand it, it has to do with our ability to generate electricity and not rely on sporadic electricity generation.

Brad Kitchens:

Thank you for your questions. Let me suggest this. We've got three people standing. Let's hear from all three and nobody else stand, so we can take a break and then we can come back and listen to Tom. So we'll hear from the three that are standing, so ma'am, I'll let you go, please.

Barbara Welch:

My name is Barbara Welch, and I'm from Brownlee, Nebraska. Population 20, more or less. I wanted to talk to you about the Sandhills just a little bit. There are 19,000 square miles, and we have 97 different types of grass that grow there. When you look out on that, you see nothing but rolling hills of grass and sand. We have a really sandy soil, and the grass roots hold that together. We've been stewards of the lands since our forefathers came here. The ranchers take care of the grass. It's our lifeline. And it's very important to us, but it's more important to our ecology. The roots are deep in some of these grass plants, some two, three and four feet, they grow down to reach the water. And they're constantly pulling, the green parts are constantly pulling carbon from the air. The pull the carbon down and store it in those roots. Now, if you go and cut the grass or damage it or whatever, of course, they don't pull the carbon anymore, but they don't release it into... The roots still hold that unlike a tree. A tree does the same thing. But if you cut it down or it burns, it lets the carbon that it stored back into our atmosphere. If these plants are disturbed in any way, then they quit pulling the carbon. I think that's de-carbonization. I figured that out on my own.

Barbara Welch:

Also, it's been brought up here a couple of times, but carbon has been blamed for global warming. I know this is an important thing to everybody. When carbon heats up the atmosphere, then it warms the earth. And I think that's something we're all concerned with. I know a lot of you have never been to the Sandhills. We hold it a precious and dear place. It's one of the last pristine prairies in the United States, in maybe the world. And we have discussed with Mr. Kent before, we've got to know him over the years, it would be a shame to come through there and tear that up, destroy that prairie, make blowouts that cannot be repaired all for the sake of wind energy. There are other routes that could have been used. The US Fish and Wildlife suggested it. But anyway, if you've never been to the Sandhills, you need to come, and you'd be welcomed by everybody there. Thank you.

Brad Kitchens:

All 20 people?

Barbara Welch:

I'm sorry.

Brad Kitchens:

All 20 people in your hometown?

Barbara Welch:

Yeah. All 20 of them, we'll stand in the street and wait for you.

Brad Kitchens:

Thank you very much. Appreciate that. Yes, sir.

Ed Beeker:

My name is Ed Beeker from North Platte. The Municipal Light & Water is my power supplier. You showed a slide, I believe, of reduction in CO2 emissions from like 2007 to 2015 or something like that. I'd like to know how much of that reduction was caused because a high portion of our manufacturing was moved to China. We reduced our emissions because our manufacturing left the country. So that had a big impact on our emissions. Is that ever factored into those numbers? We're told about electric cars. It's my understanding that China controls about 70% of the rare earths in the world. Who's going to make the metals for the batteries? It's not going to be the United States.

Ed Beeker:

You said that 35 gigatons of carbon, is that right? Was that right, 35 gigatons?

Brad Kitchens:

Roughly, yes.

Ed Beeker:

And United States produced little over five gigatons.

Tom Kent:

Of that 36, correct.

Ed Beeker:

How many of those 36 gigatons are produced by China? I'm not as old as some of the folks here, but when I went to school, we were taught about the ice ages and we were taught about sunspots and we were taught about how much impact the sun had on our climate. I remember, I believe it was in the late '70s, Time magazine had a big full front-page article that says we're entering the new ice age. And here we are, what, 40, 50 years later, and we're worried about global warming. I don't know that United States Steel or General Motors were spewing carbon dioxide in the atmosphere when the temperature raised. Thank you.

Brad Kitchens:

Thank you, sir. All right, one more, and then we'll take a short break.

Bernt Friezin:

[Bernt Friezin 01:53:58], Southwest Public Power. Back in my day, we learned in school about we were all going to die because we were entering another ice age. Then it was the hairspray we're using was going to kill us all. Then we went to R12 refrigeration was surely the end of humanity. And then it came into global warming. Well then that wasn't appropriate, and we went to climate change. Folks, there has never been years where it's been hotter than it was in the 1930s. And if you don't believe those numbers that you've been given, it's because those numbers have been doctored. The 1930s were incredible. My parents lived through them. They talked to me about them all the time. I've seen the data from the 1930s. There was very little carbon that was used. So I don't really understand why the assumption that carbon is the evil enemy. Carbon is the most prevalent element, I believe, on the face of the earth. And now, carbon is the evil enemy. And frankly, all this crap I've been fed all my life, I don't believe it. I think it's garbage. This is nothing but income re-distribution. It has nothing to do with the climate.

Brad Kitchens:

All righty. I like the passion. I like the comments. These are very helpful. We're going to take a short break. We have a lot in the room, so let me just give you a heads up. It's about five till, we're going to start up again at five after. We'll hear from Mr. Kent, and then we'll take more questions. So there's maybe some refreshments still. Five after, we'll get started. Thank you.

Brad Kitchens:

(silence).

Brad Kitchens:

We'll get started in five minutes. Five minutes. Thanks.

PART 4 OF 6 ENDS [02:04:04]

Brad Kitchens:

All right. Time check. We've got about 55 minutes.

Brad Kitchens:

So, again, we're going to have to stop at 9:00, so we have 55 minutes, which hopefully is ample time to address many of the additional questions and comments on your mind.

### 3.3.1 Discussion Draft of SD-05

Brad Kitchens:

First though, we did want to hear from Mr. Kent. I'm sure everybody knows Tom Kent's the CEO of NPPD. He's been working with the board and the leadership team over the past several months, trying to begin to think through this process of decarbonization and what makes sense for NPPD, for the state of Nebraska, in light of and in the context of what's going on in the industry overall.

Brad Kitchens:

And so, he'll share with you kind of the draft thinking, again, subject to your input. And then, we'll go back to two or three quick polling questions, and then again your comments and questions. With that, Mr. Kent, it's all yours.

Tom Kent:

Thank you. We got to figure out how to shuffle around here. I do want to start again with thanking you all for being here. I just want to clarify maybe some misperceptions at the beginning.

Tom Kent:

We are here tonight to listen. We're here tonight to get your feedback and answer your questions. And so, I really appreciate the discussion from the first hour.

Tom Kent:

Our board has not made a decision on any sort of goal or establishing a goal in terms of our carbon reduction and what that may or may not look like. They are certainly considering one, and before I'm done speaking I will show you what the current discussion draft is, and it is just a draft specifically for getting feedback from our customers.

Tom Kent:

Then, the board will take that information and use that as they deliberate and go through what they hear and learn from this process, which includes these five meetings, and also includes the feedback from the surveys that we've been talking about. Go fill out the survey on [www.nppd.com](http://www.nppd.com). Or you can also access it through a lot of your power suppliers' websites as well. That's really what's important here.

Tom Kent:

This process, in terms of looking at the business risk around our generation resource mix, specifically to the issue of carbon has been going on for a couple of years. We started a couple of years ago working with a committee of our board and our customers and our staff, to start exploring the issues and what we're seeing. In fact, Brad helped facilitate that process.

Tom Kent:

Out of that process, our board authorized a couple of vendors to do some analytical work to discuss and evaluate a couple of scenarios, specific to some assumptions in terms of what could a particular reduction scenario looked like if the board were to consider that in the future. But it wasn't anything that was near robust enough to make any sort of decisions on, and that wasn't the purpose of that purpose of that process. It was just to kind of talk about what ifs and why's.

Tom Kent:

But carbon emissions from a business standpoint, and all of our emissions from a business standpoint, is an important consideration. It's something that we look at very hard. We are regulated by multiple entities and agencies. We've been regulated for the emissions of our power plants for decades by the Environmental Protection Agency, and certainly carbon is another aspect of a business risk that we have to look at.

Tom Kent:

We have customers today, and you can tell from the discussion tonight and if you were at the meetings last week, and I assume you'll hear similar discussions tomorrow and Wednesday, that we have a very diverse group of customers with diverse opinions.

Tom Kent:

So we focus a lot on how do we find the best path forward to manage the business in a way that ensures affordable, reliable, resilient and sustainable generation resources, and reliable delivery of energy to all

of our customers and try and find that best way to meet those needs and manage risk for our customers, and that's really what the purpose of this is about tonight. And, again, appreciate your feedback.

Tom Kent:

Before I get to the draft, which is fairly short, fits on one page, I wanted to try and touch base and cover some of the questions from the previous hour. If I miss, didn't answer the question you asked or if you got a different question or I didn't get all the questions captured, we'll have time at the end for any questions and comments.

Tom Kent:

So there was a lot of discussion about the 65%, 45%, what's that mean, what's the difference? The numbers you saw up here tonight showed us going from in 2005, 29.5% carbon free to 2020, 45.4% carbon free. That is looking at the emissions of our entire generation mix that we use to serve our customers, as well as sell energy into the marketplace.

Tom Kent:

We do sell quite a bit of energy in the southwest power marketplace on a given year. The reason we're able to do that is our peak load is primarily ag-based, it's primarily driven by irrigation and the irrigation season's a couple of months, two, three months in the summer.

Tom Kent:

We have to have the resources to serve that load from a reliability standpoint, to meet our reliability obligations. And so, now those resources are there and available in those months of the year where we're not serving them to serve our load. We can use the market to sell that energy at a margin and bring that revenue back to help keep rates low for our customers. Okay?

Tom Kent:

So that's kind of how that works, that's kind of why we have that situation. It's really around the load we serve and why we're here as a public power entity, serving rural Nebraska. We have the ability and flexibility to serve a lot of load 12 months out of the year when we only have a peak that happens a couple of months in the summer primarily, okay?

Tom Kent:

So when we look at that total basis, and this is in our annual report, that's where you get that 45% number in 2020. Another number you hear about a lot, and it's an accurate number, is the 65% number. If we look at our resources that are used to serve our customers and look at the carbon free aspects of those resources, on our customer basis it's about 65%. So the difference is what's going to the marketplace versus what we're using to serve our customers. That's why you see that difference there.

Tom Kent:

Our real emissions are that 45% number. That's real emissions related to our operational activities. But as we think about the potential of being regulated at some level, in terms of our carbon emissions, one of the things we've been thinking about and we know is that were there some federal regulation that put a price on carbon, and it's been talked about for three or four administrations now. I don't know if it'll ever get passed, but were there some one of the things that we know would be one of the things we'd have to think about, is how much excess would we be selling in the market, that markets would change significantly in a future where there was a cost of carbon assigned through some future regulation. Not there today, but that's a risk in our future.

Tom Kent:

So knowing what that 65% is gives us a good feel of, okay, what would the adjustment look like in that kind of a scenario. So that's something we look at. That's why both numbers are important to us.

Tom Kent:

The next question related to that is the 29% in 2005 versus the 45% in 2020, why the big change? You didn't add any new large carbon-free units, and that is true. The big change is in 2005 and before, a big chunk of the output of Cooper nuclear station, which is our largest non-carbon emitting resource, baseload nuclear power plant, was being sold to other utilities. Lincoln Electric System was taking a big chunk of it, and MidAmerican Energy, and Iowa's taken a big chunk of it. So it wasn't really part of our mix. We had sold that off to someone else, so it wasn't included in our numbers in 2005. Those contracts expired. It's now part of our mix. We're using it to serve our customers and that's why you saw that big increase.

Tom Kent:

All right. So decommissioning costs for wind. We can probably find a number. I don't know what that is off the top of my head. There was a question about what if we were to retire our largest plant and replace that with wind turbines. One of the smart people in the back of the room that's responsible for making this place work so well did a back of the napkin calculation during the break. And Gentleman's Station as a unit, as a plant, is about 8.5 million megawatt hours or energy a year. Is that right, Jim?

Jim:

Give or take.

Tom Kent:

Give or take, okay. So to replace that with enough wind turbines, no one's suggesting that happens. To replace that with enough wind turbines to give you about the same amount of energy it'd be 600-900 wind turbines at three megawatts a piece, given the average capacity factor of wind.

Tom Kent:

No one's suggesting that would happen. No one's suggesting that's a good idea, but that answers and gives you kind of a rough comparison of some of the trade-offs that we have to think about as a utility.

Tom Kent:

Let's talk about February a little bit. That came up quite a bit. I mentioned in the previous hour the fact that Nebraska, our utility, the other utilities in Nebraska and all the members of the Southwest Power Pool are part of this giant electrical machine, the eastern interconnect of the United States.

Tom Kent:

One of the things that we all have to do as utilities is ensure that interconnect stays in balance. Each of those regional transmission organizations that Tom referred to, that's one of their functions that they have to do from a federal regulatory standpoint, is to ensure that the supply of energy and the demand of energy, electricity, stay in balance at all times. It's something that happens every second of every minute of every hour of every day of every month of every year. It's a real time balancing process.

Tom Kent:

So that's the stage. And the utilities, as members, we all bring resources into that pool. We share those resources. There's real efficiency gains and cost savings for our customers because we're able to share those resources and share that balancing risk across that entire area.

Tom Kent:

So February: What happened in February boils down to a lack of generation within the Southwest Power Pool region, something they had not seen in their 75-plus year history. It was driven by a couple of related things: extreme cold and very high demand for natural gas.

Tom Kent:

And so, the high demand for natural gas caused the prices to go way up, like hundred times more than normal. In fact, during that weekend of that event we were holding two special meetings with our board to get authority to buy more gas so we could keep our power plant running in Beatrice Canaday.

Tom Kent:

And then, the extreme cold. The extreme cold impacted gas because there was gas wells and gas lines that froze up. In the south, this was especially in Texas but we also saw it in the southern part of the Southwest Power Pool footprint.

Tom Kent:

And it impacted the ability of generation plants to run reliably, because in the extreme cold if the plants aren't designed and don't have the heating, and it doesn't matter whether it's a wind farm, a gas turbine, a coal plant or a nuclear plant, they got to be designed to work in the environment you expect them to

work in. And some of the plants in the southern part of the region, they had challenges because they weren't ready to operate in weather that was that cold for that long.

Tom Kent:

So got in a situation where thousands megawatts of power plants that were normally available were not available, because they either didn't have fuel or couldn't run in the cold weather.

Tom Kent:

Now, let's talk about the northern plants. We'll draw a line at the southern border of Nebraska, go north. The plants here are designed and operated assuming really cold weather. Our operators, our technicians, our maintenance folks, our engineers, we've got lots of experience designing and operating those plants. So though it's really hard on facilities when it's really cold, our plants ran through that. They were able to run through that.

Tom Kent:

We did have some issues. We had a gas supply valve at Beatrice Power Station, which is a gas plant that we have, that actually froze up in the cold weather. We had technicians in the middle of the night, in 30-degree weather, out fixing it. That's why I said earlier a lot of great things happened. We were able to serve our customers, and it's because of the people that work in those power plants, the people that work in the field. I just want to make sure they get the credit they deserve. They're your friends and neighbors.

Tom Kent:

Same thing with how we run our peaking units, which are small gas turbines we have throughout the state. We had technicians at those plants making sure they had fuel, making sure they were warm and ready to run. So we were prepared. Not everyone was adequately prepared. You'll see information in Texas and other places where coal plants had issues. There was a nuclear plant that had issues in Texas, a piece of equipment froze up. Nothing safety related but it froze up.

Tom Kent:

So that was the big thing. Didn't have the generation you were counting on. Let's talk about wind as part of that. As operators of utilities we have to balance load. We talked about how as load moves, generation has to move. We also have these intermittent resources, wind and solar. We also have these new distributed resources where consumers are becoming prosumers and they may have solar panels on their homes, or they may have a plug-in Ford lighting truck, not yet but coming, that they can use to power their house in certain situations.

Tom Kent:

As a utility, we got to kind of balance all that. So we have to forecast out and look at what's going to happen with the wind and look at what's going to happen with those resources, because at the end of the day we have to keep everything in balance, every minute, every hour of the day.

Tom Kent:

The wind in February actually came in at what the utilities were roughly expecting to see happen. We didn't expect to see a lot of wind on those days during that week in February. The weather patterns tend to be in this part of the country, in the Midwest, when it's really cold in the winter and when it's really hot in the summer, except for when I came to North Platte today, the wind doesn't blow as much, and that's kind of the trend. It's not that way every day necessarily, but that's kind of the trend. So we have to account for that as we plan and operate our resources.

Tom Kent:

So the wind was kind of there that day, but we were still way short on generation. And when you get to the point where the load keeps going up because it's really cold and everyone wants to use more electricity and you run out of generation to serve that load, the operators that are responsible for keeping things in balance and protecting the system from falling apart and having a days and weeks long outage, they don't have many tools left in their toolbox. And the tools they go to are I can't increase generation anymore. I have to reduce load in order to protect the whole system from falling apart. And that's what you saw happen in February. It's exactly that.

Tom Kent:

The operators took what I'll refer to as heroic efforts, following their plans which they have and they exercise annually, to ensure that we didn't have a wider spread, more damaging cascading outage. And yes, it was inconvenient, and yes, it sucked. And yes, you should be upset that your power went off. But I want you to know that what the operators did that day was absolutely necessary to prevent something worse from happening.

Tom Kent:

So how did NPPD make so much money that day or that week? So our plants were running well. And the way the market works, the market sets the price on supply and demand, just like a corn market does or a wheat market or an oil market. So the demand's really high, the supply's really low. The prices are really high, and the prices that we were getting paid because our plants were running was a lot higher than our cost to make the electricity. That's a good day for our customers in Nebraska. Right?

Tom Kent:

So that is the result of the investment that you and your parents and grandparents and your children have made in the public power system in Nebraska, is that effort and that work. So hopefully that answered those questions.

Tom Kent:

Senator Groene asked a little bit, and then I had an individual come up and you asked during... Wherever he went. He asked during his comments about... There he is, thank you. I lost you. About carbon capture

and sequestration and whether we're looking at that. And so, I wanted to talk a little bit about some of the things we've been working on as a utility to manage this risk of carbon.

Tom Kent:

One is we're working with other industries in the state, ethanol industry, for example. We have a few projects that have been funded through the DOE to look at ways to capture carbon and to use it for other uses, to sequester it in the ground, maybe use it for enhanced oil recovery. All of those things are things that if we can partner with our customers, it helps them be stronger, more viable, sell their product into a marketplace that's concerned about carbon emissions, if we can help them capture carbon. So carbon capture and sequestration is an important project we're looking at.

Tom Kent:

We're looking at it, Gerald Gentleman Station, looking at things like characterizing deep well formations. As the Senator mentioned there was a law passed this year in the Legislature that really is helpful for those kinds of things. And so, I want to thank the Legislature for that.

Tom Kent:

We also are working with the ag economy. We've partnered with a large co-op in Eastern Nebraska to look at ag sequestration, so farming practices is mentioned by Mrs. Welch in terms of ranching practices. Farming practices are similar. There's ways that you can capture carbon and keep it in the soil. And that's good things for the farm economy. It's good things for the soil. And if we can measure that accurately, can show through those farming practices that we can net add carbon to the soil, that's a way to create credits potentially that help offset some of our emissions down the road.

Tom Kent:

Again, these are all things that are early in kind of the thought and discussion process, but things that are important as we look at how best to serve the people of Nebraska and help our customers address these issues.

Tom Kent:

Someone mentioned Monolith and the fact that we're working with them. Monolith is very interested in being able to show that the product they make, hydrogen and carbon black, is made through renewable resources. They're going to be a large user of electricity, about two million megawatt hours a year was mentioned. And so, we are working with them to find a way working with their power supplier, [inaudible 02:26:04] power district, one of our wholesale customers, to serve their need to have renewable electricity for their process so that they can meet the needs of their customers who are asking for their products coming from renewable or carbon-free resources.

Tom Kent:

That kind of stuff's happening in the world. We have to be prepared, as the public power district, as the people that serve you, is as those things change we're ready to change with you and provide those services. That's why we're here today, to listen and learn.

Tom Kent:

I'm not sure I got them all but I got most of it. I want to run through the discussion draft. It won't take very long. And then we'll open it up for questions and comments. Okay? Ready?

Tom Kent:

So, again, this is written like it's a product but it's not yet. It's a draft for discussion. Our board will spend time listening and understanding and learning from these meetings, and discussing with our customers more about whether we should have a carbon directive or whether we shouldn't. And if we have one, what should it say. And I hope that discussion finishes up between now and the end of the year. That's a hope for me as a CEO. It's the board's process.

Tom Kent:

The board establishes, I call it a strategic directive. It's policy guidance. They are elected by you, our customers, to provide oversight and policy guidance for us as an organization. That's how public power works.

Tom Kent:

We have a board directive that talks about safety. We have a board directive that talks about reliability. We have a board directive that talks about cost competitiveness or affordability. We have board directives on customer service, on energy efficiency. These are high-level guides that the board says, "This is where we expect this organization to go in relation to these important issues."

Tom Kent:

This particular one has to do with our generation mix and our carbon emissions. The first paragraph, I'm not going to read all these, but this is just basically the preamble. This is basically saying this is why, this is the background, this is why we have this. Next.

Tom Kent:

Second paragraph's the goal. Again, this is a draft goal for discussion. And basically the goal for discussion and consideration, not a final product, is to achieve net zero, so be able to use a mix of resources, be able to use carbon credits, so that we continue to reduce our net emissions to zero by 2050, which is a fairly reasonable goal. It's an aspirational goal. It's fairly typical to, and Brad can give you and these guys can give you facts, but it's fairly typical to what we're seeing and what we're seeing a lot of these other businesses and stuff look at.

Tom Kent:

Lots of ways to do that. Diversity is really important in a resource mix. We have a very diverse resource mix today. You saw that in the slides. Maintaining a diverse resource mix helps us ensure reliability, helps us ensure affordability and helps us be resilient. So a diverse resource mix is part of this goal, and how to achieve that economically. Can we economically sequester carbon at Gerald Gentleman Station? Can we continue to economically address the other regulatory emissions issues that we have to address at Gerald Gentleman Station?

Tom Kent:

There's several different air emissions that we're regulated by, and those national standards change over time. So we have to continually assess and evaluate with all of our power plants, with all of our regulations. What's the best way to continue to meet those regulatory requirements and assure affordable, reliable electricity for our customer. This is just another part of that discussion for us. Next slide.

Tom Kent:

So this talks about the measurement. We, as management, the board sets objectives, they set goals. We report on measures, report on performance. So this is basically saying we're going to continue to do that. We do it today. We measure in two ways. We measure in intensity, which is like the miles per gallon on your car. It's the amount of pounds per megawatt hour we generate, and we measure in total amount of emissions, total tons. Next slide.

Tom Kent:

And then, this last paragraph is what I refer to as the off-ramps. We've certainly heard it tonight and we've heard it in the other sessions, and our board has recognized this through our discussions internally and our discussions with our customers, that affordability and reliability and resilience are extremely important.

Tom Kent:

So all this says is if meeting this goal causes us to compromise or create some issues with either the affordability goal, that's the cost competitiveness goal, or the reliability goal, strategic directives that the board has established, the board's going to step back and look at this again. And then, they'll make a decision on whether this goal should adjust. It's really all that says, is that they're going to commit to upfront saying, "We'll take a look at this if we need to, if it comes to issues between this affordability, reliability, resilience."

Tom Kent:

That's it. It all fits on one page. So there you go. I answered some questions. If you have more, ask them. If you have more comments we want to hear them. Again, this is a process for us to listen and learn, and for our board to gather information.

Brad Kitchens:

Maybe a quick poll or two, and then we'll take questions. And ag, the polling is not just for interesting feedback, but we really will use the stats and take this back to NPPD.

Brad Kitchens:

So three quick polling questions. The first one is in your opinion is a net zero decarbonization goal by 2050 too ambitious, feels about right, not ambitious enough, or at this stage I don't have an opinion?

Brad Kitchens:

And while you're doing that, I will say just to echo what Tom said, again, spending a lot of time with a lot of companies and doing a lot of research, that this decarbonization draft goal I would say 80% of the utilities, IOUs, public power and co-op GnTs across the country are leaning toward that strike zone, so that is not out of the norm.

Brad Kitchens:

There you go, too ambitious far and away the number one. I don't think that's a surprise, given the comments that we've heard thus far. Again, just to give you some contrast, that is not what we saw on the previous two settings, so it is interesting, at least when you march around the state. There are different point of views. Shouldn't be surprised, but just to let you know that is a little inconsistent with what we've seen elsewhere, but helpful.

Brad Kitchens:

Question number two, given this 30-year aspirational goal, how often do you think the leadership and the board ought to seriously look at the goal and, as he said, maybe consider tightening it, loosening it, changing it, modifying it; every one to five years, six to 10 years, or 10-plus? If you were giving guidance to the board, how often should they take a hard look and make appropriate adjustments?

Brad Kitchens:

Pretty sure I know where this will land. Wherever you're ready, Jim. Yeah, I think that's right. And again, just the other session said the same thing, absolutely. Why wouldn't the board keep an active eye on this and an active eye on what's taken place in Nebraska and the country around the world, with climate? Like it, don't like it, believe it, don't believe it, making sure we stay on top of this on a frequent basis seems to make sense.

Brad Kitchens:

And the last one of the information presented tonight what would you feel you need more information on [inaudible 02:34:05] better understand this notion of risks associated with being carbon emitting: The core utility principles, and again, that trade-off and balance, NPPD's carbon reduction discussion draft, you need to understand that better, or at this stage you're good? If you have to select one of those four.

We appreciate based on two-and-a-half hours and what you've read and what you already know, but where would you place your bet?

Brad Kitchens:

I don't remember where. I think probably wherever you're [inaudible 02:34:44]. So pretty equally distributed across all four of those. I was expecting the core utility principles to be the number one, because that was the number one, I believe, in the other couple of settings. So if you'd like a further understanding of the risks associated with being a carbon-emitting utility, a little bit about the carbon principles, more about the discussion draft-

PART 5 OF 6 ENDS [02:35:04]

Brad Kitchens:

Admitting utility, a little bit about the carbon principles, more about the discussion draft that Tom just outlined or no mas at this time. So those are all the polling questions. As we heard her say that the survey questions have similar sorts of things that we'll be asking, so please go there in the next week or two as well so we can have all this data available for the leadership. And we'll take it back to open questions and comments. Sir, you're up.

### 3.3.2 Second Public Comments

Josh Friesen:

I'm Josh Friesen from Wallace. We buy electricity from Southwest and Midwest Electric. For a job, I'm in the phytoremediation business. We take carbon, use solar power filtered from the air, and we export that carbon all around the world in corn and beef that people in other countries pay us to get rid of it for. So we're not new to this whole de-carbonization thing. That's what our state economy is based on. So speaking of jobs, I would like to talk to the NPPD board a little bit. So I've got a copy of the mission statement of the board, which is basically job description for the board of directors. It says safely generate and deliver reliable, low cost, sustainable energy and related services while providing outstanding customer service. Nowhere in that job description is listed things like environmental justice, de-carbonization, popularity. That's the job description that the people that own NPPD want the board to follow. We don't want the board to follow the social pressures from the coasts, from anywhere else. We just want reliable energy that's cheap. That's what our businesses are based on, and that's what we want.

Josh Friesen:

We remove so much carbon, it's been mentioned a few times in this state from the atmosphere. We're the last people that want to sit there and have people preach to us about making the thing we do for a living less efficient by having to pay more for it in "renewable ways." Sorry. Brevity, I know, I know, I know.

Josh Friesen:

You know, the whole economics of this thing should be what drive... I mean, you're in business of selling electricity. That's what NPPD does. So let's let the economics drive it. If we have customers that want

renewable green, wind energy that shows up when the wind blows and the sun shines, we could sell it to them. You can make it and sell it to them. 20 years ago, I was living in Laramie, Wyoming. You could check a little box on your electric bill, and you could pay double and have wind energy. You had the same electricity as your neighbor that didn't check it, but you could check it and pay double. Now the one thing it was missing was a little control box that went on your house. So when the wind didn't blow, they shut your house off first. So if NPPD has customers that want this unreliable, green energy or whatever, zero carbon emission energy, let's let that customer, say [inaudible 02:38:10] or whoever, if their customer base wants that, fair enough. You can pay for it. Let it control you first when the load exceeds the production. Everybody is happy.

Josh Friesen:

But the people here most likely don't want to check that box for double the price of electricity and less reliability. That's not the business we're in. Give people a choice. Let the economics of it drive the decisions of the board. Thanks.

Brad Kitchens:

Please, we still have 20 minutes. We welcome other questions or comments. We have somebody over here. Please.

Brandon Kelliher:

I'll carry the microphone over there in a second, Mr. [Allsaster 02:38:59]. You can talk a little more.

Brad Kitchens:

No, just stay there.

Brandon Kelliher:

My name is Brandon Kelliher, and I have the honor of being the mayor of North Platte. First of all, I want to thank you guys for coming out and being here. I'm often on the receiving end of public comment, and I know it's not always the most fun and enjoyable thing in the world. But I think you've got a pretty good crowd tonight, so I appreciate everyone's thoughts.

Brandon Kelliher:

With regard to power, in my mind, I think the reliability aspect is the most important. That being said, I don't think anybody probably wants a dirtier power. So the way I think about your efforts under power generation is this, in 1999, most of you remember, those of you that aren't too young, we were all very worried about Y2K. Remember? We ran around, spent millions of dollars testing computers. We did all sorts of things to prepare. And by and large, it wasn't that big of a deal in the deal. Remember? I was one of those people. I worked in the technology industry. And at that time, we couldn't conceive of the fact that in 1999 we would be able to have a little computer that most of us carry on our belt or in our pocket,

and we'd have access to the world's information for the most part. Now, I bet 80%, 90% of you have one of these in your pocket today, right?

Brandon Kelliher:

The technology of this and your world is changing dramatically. So if there's one thing that I would ask you to do, take some of that 100 million dollars and invest in that technology that doesn't destroy the Sandhills, doesn't destroy the crops. Do something different with it to make clean power that will benefit all of us at a low cost. Thank you.

Brad Kitchens:

Thank you.

Speaker 9:

I wanted to clarify. What's your definition of zero carbon? Natural gas is half coal, but it's still carbon. Building a wind generator takes a lot of carbon. Replacing it takes a lot of carbon. I don't know if we're going to have electric semis to haul the propellers to the landfill, but also solar panels takes a lot of carbon. What all factors into your zero? And when you zero in 50 years, that tells me no coal, unless you can sequester it all. So what's your definition of zero?

Speaker 10:

Hello. There we go. In my back? All right. So that is a great question. It's a challenging question in some ways because you can look at carbon from a lot of different aspects. And certainly as you pointed out, the lifecycle cost of carbon or you can pick any constrained resources and think about doing technology from a lifecycle standpoint, and there's a lot you can go into when you at it holistically. So if you look at the lifecycle impacts that carbon from drawing corn to making ethanol and all the things that go with that, people have studied that stuff to try and show that or if you look at the lifecycle impacts of wind turbines or solar farms or coal plants, how far back do you go? Because there's certainly, since we're talking about carbon, there's certainly costs related to carbon in the steel that's in the coal plant, in the concrete that's in a nuclear plant. So yeah, it's a very complex issue.

Speaker 10:

We're focused for our goal on net zero, so looking at our emissions combined with offsets. 2050 is a long ways off, but that's the target. We've made some improvements over this timeframe. We're looking at more improvements in the future. And we're looking at it from our process of taking fuel and converting it to electricity and the ways we do that. And then, we also have ways to create offsets in credits or through things like sequestration, things like egg sequestration, carbon capture in storage. So that's how we're bounding it for this goal. It's the input's the fuel, the output's the electricity and then the offsets that we can create with that. But again, that's a really complex question, and...

Speaker 9:

Well, after 50 years, there'll still be coal.

Speaker 10:

There certainly could still be coal in 50 years. I'm not going to guarantee you what 50 years will bring. I can tell you what I hope it brings, but my-

Speaker 9:

Have you seen any models? Scientists read the models. Have you seen any models where you go to zero and still have coal?

Speaker 10:

Are there models where you could go to zero and still have coal? Yeah, I think so.

Speaker 9:

The [DOE 02:43:45] and other studies, almost in every case, if they're looking at 2050 net zero, in almost every case, carbon capture in storage is viewed as one of the slices of solutions that has to be available to us to make that happen, which is... they presume it's coal.

Speaker 10:

Yeah. So I think nuclear is part of it. I think carbon capture in storage is part of it. I think wind, hydro, and solar are part of it, gas will be part of it with capture potentially. There is a lot of ways to get there. What way is the best, we're going to figure out over time. It's going to be a combination of the environmental benefits with reliability goals and with affordability goals. All those factors that we talked about through this discussion over these two hours. I can't guarantee you. My crystal ball is not that good on what exactly our mix will look like in 50 years, but I think all of those things are part of that discussion.

Speaker 9:

One last comment from people, we've all lived through science. [inaudible 02:44:47], 1976, Jimmy Carter told us we'd be out of fossil fuels in 20 years. Carl Sagan and all the scientists, I was sitting right there when you back then said, "We'll be out in 20 years." And they said, "Coal was the answer. We're burning the petroleum." Do you remember that one?

Speaker 10:

Oh, yeah. I also remember going to an EPRI conference about eight years ago where there was a person, hopefully it's not either of you two, that said the earth was full of natural gas, and all of us from the industry in the room said, "Are you nuts?" And now, there's a lot more natural gas than people thought 10 years ago we were going to have.

Speaker 9:

Just the point is we've seen a lot of this. We understand. We're not Neanderthals out here. We've seen the science, and we've seen the science proved wrong before. So we are skeptical. And I will say this, I don't think the scientists will disagree with me anywhere. There is not one more atom of carbon in the world from the day God made the world, correct? There's no way to make carbon. You can combine it with other elements. But the same amount of molecules that were here since creation is still here. Can anybody disagree with me? I don't think so. Man can't make more carbon.

Speaker 10:

We don't need to get into nuclear fission and fusion right now, so we won't.

Speaker 9:

[inaudible 02:46:13].

Speaker 10:

Go ahead. I'll answer your question. Go ahead, Tom.

Tom:

Just one comment on the natural gas is that through technology innovation, we have actually increased our access to natural gas. That's why we, at the time period in the early, guess it was probably early '80s, I think I remember that's when they took my gas lamp off the front of my house because we were going to run out of gas. That was conventional gas, not... So it's one of the things I think that Alan and I have both tried to underscore is that the secret weapon that's called on in all of this...

Speaker 11:

Your mic's not on by the way.

Tom:

It's not on?

Speaker 11:

No.

Tom:

Hate it when that happens.

Speaker 11:

Do you have the switch on?

Tom:

I have a real loud voice. I'll solve that problem.

Speaker 11:

It means you're not on the record though.

Tom:

I see.

Speaker 11:

By the way, when you guys don't use the microphone over there, you're not on the record either. So the last speaker was not on the record.

Tom:

Can you? Whoa... yeah, I guess the answer. It's definitely on the record.

Tom:

So the secret weapon is technology, because as we advance with technology, we change the underlying economics which becomes the key driver. And if there is a testimony out there, it's this crazy thing. In terms of, A, what you can do with it, and B, it's physical size. Did somebody use a brick, that's what the original mobile phones looked like. They were really large and heavy and limited. This is the strongest testimony I can share how technology alters the equation.

Tom:

Somebody did ask a question what percent did China contribute to that 36 gigatons, about 25%.

Speaker 8:

All right. We have three more I see. Did you want to say something, Tom, to the nuclear?

Tom:

Yeah. So the question about nuclear, what about nuclear? It's something else that we're watching and following very closely. NPPD is one of 21 companies in the United States that have the technical confidence, the staff, the personnel, the training and the license from the Nuclear Regulatory Commission to safely operate a commercial nuclear reactor. That provides us 800 megawatts of around the clock carbon-free energy. It's an important part of our resource mix today, and it's a competitive advantage

that we have over a lot of other utilities because like I said, there's only 21 utilities that have the ability to do that today. So we're watching very closely what the next generation of nuclear power might bring. There's a lot of advanced nuclear kind of projects on the drawing boards in various stages of licensing and development. EPRI is very engaged and supporting a lot of the R&D around some of those areas. We could probably have another three-hour session just talking about some of that stuff.

Tom:

There's a conference coming up later this fall in Lincoln, an advanced nuclear forum. It's through Southeast Community College. The attendance is limited. I don't know if it's filled up yet, but it was open to the public, so if you're interested and want to be in Lincoln, I think it's... I don't remember the date in October, but it's certainly going to be an opportunity to hear some of what's going on in the advanced nuclear world.

Speaker 8:

All right. We have... I see four people. And again, just a quick time check, about 12 minutes, so keep that in mind. Yes, ma'am.

Pam Fricks:

Okay. I'm Pam Fricks, and I'm from Twin Valley Public Power. I live on a farm south of Cambridge. I've been to a lot of hearings lately. And one thing that I've understood is that we really need to look into who it is that are the experts. So I just want to share a little bit of what I just looked up this evening. The EPRI, Electric Power Research Institute, is an American independent nonprofit organization that conducts research and development related to the generation, delivery and use of electricity. And then you mentioned the things that you've mentioned here. Here's where the offices are: Palo Alto, California; Charlotte, North Carolina; Knoxville, Tennessee; and Lenox, Massachusetts.

Pam Fricks:

And this is a little bit about the history. Following the blackout, leaders in Congress held hearings in the early 1970s about the lack of research supporting the power industry. Dr. Chauncey Starr, then the Dean of UCLA School of Engineering and Applied Science led the initiative proposed by Congress to create an independent research and development organization to support the electricity sector and address its technical and operational challenges. And I see where the government has just given you a big grant, I think it was, what was it, 3.44 million dollars just recently. Is that right? I mean, that was all over the website.

Pam Fricks:

So anyway, I just encourage you to investigate who we've hired and how we happen to hire this particular group of people. Thank you.

Speaker 8:

They are the experts. Yes, ma'am.

Brenda Fournier:

My name is Brenda Fournier, North Platte, and Municipal Light and Water is my company. I was wondering why hydrogen power wasn't on your list. And it is the cleanest form of energy. The runoff or emissions is water, which we also give to other states and our farmers use. It takes oxygen to make it and hydrogen. Have you guys thought about hydrogen power?

Tom Kent:

Yes, definitely. From NPPD's perspective, we've been very interested in the ability to use hydrogen as part of our power supply. We mentioned the Monolith project here earlier, and that originally started. One of the products they make is hydrogen. That originally started with the concept of us using that to power one of our units at Sheldon Station. They have since decided they can get more value of that hydrogen by making it into fertilizer, so that's going to be very clean fertilizer compared to how fertilizer is normally produced. And that'll be a great benefit for the egg economy in Nebraska. But we still spend a lot of time and effort working the EPRI and others and our own staff investigating hydrogen as a way to store energy and use it at a different time. The primary way of making it today outside of what Monolith is doing is through electrolysis, and it's still fairly expensive. But it's something they're watching very closely.

Tom Kent:

I don't know if the EPRI guys wanted to add anything.

Speaker 12:

I actually have a major project in hydrogen. The simple message about hydrogen is that if you don't make it, in order for it to be a queen resource, non-carbon emitting, it has to be made from a non-carbon source. The simplest way of making it is electrolysis. That means you take water, and when you split it, you get oxygen and hydrogen. Hydrogen does not occur naturally as a free gas. So you must always create it. And-

Brenda Fournier:

So what is the production... what is the emission?

Speaker 12:

The emissions from combusting hydrogen is really zero-

Brenda Fournier:

[crosstalk 02:53:52].

Speaker 12:

Yeah. Most of the world gets with water [inaudible 02:53:56]. Most of the world makes hydrogen from natural gas. And if you make from natural gas, all the carbon you thought you saved...

Tom:

You didn't.

Speaker 12:

... you didn't. You might as well burn the gas directly because it will be more efficient.

Brenda Fournier:

So you can't use water in order to create?

Speaker 12:

You can use water, but you've got to electrify it, that process called electrolysis.

Brenda Fournier:

[inaudible 02:54:24].

Speaker 12:

You mean to have hydrogen? It has its own set of issues. We had a little balloon problem with that.

Tom:

So that's the challenge. There is really no silver bullet, right? It's finding the best mix of resources, the best mix of technology, the best mix of communications to manage reliability, manage risk, manage safety, manage affordability. And so, that's why diversity is really important. Yeah, hydrogen can be part of the answer. Yes, nuclear can be part of the answer. Coal can be part of the answer, so on. Some of these new technologies have to become part of that as we want to, over time, potentially further reduce our carbon emissions.

Brenda Fournier:

Have you guys done the research on the hydrogen power? I mean it wasn't listed in your slides, so I was just curious.

Tom:

So, we don't have a hydrogen producing power plant today for using it to store and make electricity from. I'll let the EPRI guys talk about some of their research, really short.

Speaker 8:

Briefly, please.

Speaker 13:

We have a very significant research going on right now interestingly enough with the gas companies. I think we have all the major gas companies, the Chevrons, everyone else looking at how you look at low carbon resource, things like hydrogen and other fuels from a carbon reduction, so absolutely. And it is very active right now. It's a substantial effort going through.

Speaker 8:

There are probably several other technologies that were not listed that are possibilities for the future as well. Yes, sir.

Dean:

I am Dean [Dian 02:56:22]. I have a lot of interest in having reliable electricity here. And it comes from North Platte Municipal Light and Water. Someone mentioned, and I thought about a third plant there at Sutherland. And I wondered if that wouldn't be the most efficient to increase more. He was telling me that the plants, Sutherland has 600 and 900 wind towers, and so another plant would be as good as maybe 400 wind towers. And if you did that, can you get the juice away from Sutherland? Is that a possibility into the network? And then my question about that problem that we had this last winter, I was really in a mess for a day or two there because I had heat tapes, I had furnaces that are gas but they won't run without electricity. Had to figure out how you get power going. And blamed that on Texas. Texas is not thinking about this kind of thing happening, and there are all of these hardware stores still, hundreds of plugin electrical heating units of all kinds. And that is the least efficient way to heat, I think. So what do you think about that? I will wait until you answer.

Tom:

Thank you. So I guess, quickly in regards to future generation using your example, anywhere we have an existing site, certainly one of the things we look at is we assess and evaluate additional generation, is can we use one of our existing locations to add generation. So Gerald Gentleman Station, Sheldon Station, Cooper Station would all be candidates because they have a lot of the resources there you need to effectively and safely operate a power plant. Certainly one of the considerations for any kind of generation is that you have the ability to transmit that energy safely into the grid. And so as you add more generation, typically what happens is the transmission system has to expand to support that. So that's something that has to be evaluated in that process of determining where to locate generation.

Speaker 8:

Were you suggesting a coal unit, new coal unit or some other source of generation at that station?

Dean:

Yeah, I think we're going to figure out a way to [inaudible 02:59:10].

Speaker 8:

Got you. Okay. It'd be hard to raise money for a new coal unit in the United States today, I think, if not impossible. Yes ma'am.

Twila Whipp:

Thank you. I'm [Twila Whipp 02:59:30] from Bedford, Thomas County, and Custer Public Power is our provider. I'd like to ask Mr. Kent, will you be posting on your website the accurate numbers of each of the polling questions for each of the meetings? So, we know what other areas of the state and how they felt. I'm sorry, I don't remember your name.

Brad Kitchens:

Brad.

Twila Whipp:

You've made comments about this one's higher and this one's lower and this and that. I think it would be very informative for the rest of us to see what the other people are thinking.

Tom:

Okay.

Twila Whipp:

Okay? And then you're saying that you hold these meetings across the state to get input from Nebraskans and the info you get at these meetings will then help you determine your final draft. Is that right?

Tom:

Yes.

Twila Whipp:

Okay. That reminds me of three years ago when you and your staff were telling people up along the [R line 03:00:35] to come to these meetings and you would listen to them, and things would... you'd take all that under advisement for the 345K high voltage transmission line known as the R project. That didn't happen. You had it all in your mind already what you were going to do. And I'm concerned about if you have it all in your mind right now of what you're going to do. You've given this too many times and tried to make it all look nice, following all the rules, but then you don't take it under advisement. Thank you.

Brad Kitchens:

Thank you. Last one, please.

Brad Bartak:

Brad Bartak, Custer Public Power. My directive to the board of directors is to stay a net exporter of energy and not become a net importer. If you become a net importer, Custer Public Power does not need NPPD.

Brad Kitchens:

If you look at one or two of the companies in [inaudible 03:01:45] that filed for bankruptcy, those were the net importers, said to your point. So if you rely on the market exclusively, you can be burned by the market, so point well taken.

Brad Kitchens:

Again, thank you so much. I'll turn it over to Tom here, but we appreciate your input. We're trying to keep ourselves on time. Thank you for joining us. And Tom, I'll let you close the night out.

Tom:

Yeah. Just quickly, really appreciate all the feedback tonight. Thank you all for being here. I know there's a gazillion funner, cooler things you could have done than sat in this room for three hours, but it's really important that we had a chance to hear your feedback, you had a chance to participate in the discussion. And thank you all for being here. And have a safe drive home. Take care.

Tom:

Oh, gosh, yes. Don't forget the survey. I've only plugged it two times, three times, [www.nppd.com](http://www.nppd.com). So, thank you.

PART 6 OF 6 ENDS [03:03:40]

### 3.4 Scottsbluff

Tim Arlt:

[crosstalk 00:00:28]

Tim Arlt:

Are those also partners in the back? [inaudible 00:00:52]

Speaker 1:

Yeah. I think sitting manager and PBD workers.

Tim Arlt:

I'm sorry?

Speaker 1:

And PBD guys in the blue and the green.

Tim Arlt:

Okay.

Speaker 1:

They have an operation center here.

Tim Arlt:

So, it's really this patch over here that are the new ones.

Speaker 1:

I believe that's...

Tim Arlt:

Okay. We're going to go ahead and get started, it is six o'clock and we're in it. So, if I could ask you to take a seat.

Tim Arlt:

Good evening. On behalf of the NPPD board of directors, management and staff, welcome. We certainly appreciate all of you taking time out of your busy schedules to spend an evening with us to engage in this outreach effort in this public forum. My name is Tim Arlt, I'm the Vice President of Corporate Strategy and Innovation at NPPD. A couple of housekeeping items here before we get going. If the fire alarms sound, we're asked to go to the nearest exit and muster out in parking lots. If the tornado sirens sound, we're to exit either side here, go to the rear and there is an entrance to the basement and that is where we are to muster for tornado. There is an AED at the front desk in case we need it and if we do need it, I would ask Conrad to call 911 to get medical help on the way.

Tim Arlt:

Some quick facts about NPPD. NPPD is Nebraska's largest generation and transmission utility. We are also a political subdivision of the state of Nebraska. We have about 1.2 billion dollars in operating revenues

any given year. We own and operate 31 generation facilities providing 3,600 megawatts of diverse generation, so for some scale, the community of Scott's Bluff peaks roughly around 70 megawatts, so that's by a hundred. Hundreds is what we have and own and operate in support of all the citizens of Nebraska. We own and operate over 7800 miles of lines serving parts of 86 of 93 counties in the state. We provide power, either at wholesale or retail, to 403 of Nebraska's 530 communities. We work in partnership with other utilities to serve more than 6000 Nebraskans. We're governed locally by an 11-member elected board of directors. Our mission is to safely generate and deliver reliable, low-cost, sustainable energy and related services, while providing outstanding customer service.

Tim Arlt:

Based on our 2022 proposed rate schedule, wholesale customers will experience no increase in the base rates for the fifth consecutive year, and for our retail communities, the ninth consecutive year. Public power in Nebraska provides rates that are competitive and low nationally. Nebraska's residential rates were ranked the 8th lowest in the nation according to the latest Energy Information Administration information. NPPD residential rates are below the state average. NPPD strives to power our local economies and find innovative, practical solutions to environmental, social and community needs. We are not-for-profit, controlled locally and focused on our customers. We would not exist without our customers.

Tim Arlt:

So, the purpose of our meeting tonight is to start the conversation and to get input from the public surrounding the value of public power in Nebraska. NPPD's current and future generation mix. The state of de-carbonization as we prepare our next integrated resource plan to be completed by the spring of 2023. NPPD's board continues to move forward with the development of a sustainable carbon emissions reduction strategic directive that will possibly include carbon reduction goals for the district. NPPD is committed to seeking customer feedback as a not-for profit public entity of the state, which is governed locally by the constituents - you. We aim to operate with transparency and open communications at all times.

Tim Arlt:

This is the fourth of five forums we are conducting across the state to gather public feedback and input. Conversation today will be specifically centered around the risks of being a carbon omitting utility, how NPPD's carbon reduction goals should be structured. What principles - reliability, resiliency, affordability, our environmental impact - are most important to maintain as NPPD works to reduce its carbon emissions. The goals for tonight are pretty simple, however the topic is very complex. Our goal is to give you a good general understanding of them so you can provide us valuable, informed feedback. We ask that you try to hold questions until after the presentation to ensure we get through the material. Please take what you hear and learn tonight and apply it to this effort and initiative by completing the survey found on [NPPD.com](http://NPPD.com) regarding this topic.

Tim Arlt:

So, our agenda for tonight, pretty straightforward, we have speakers here from the Electric Power Research Institute and they'll provide background on the topics of discussion. The slides are also available at NPPD.com. Live polling will be conducted throughout the night to gather collective feedback. NPPD President and CEO Tom Kent will speak on a discussion draft of the carbon emissions goal. There will be plenty of time throughout for you to comment and provide feedback back to us. We are here to listen. We are recording this meeting to capture all of your questions and comments to ensure that we have them and can address them later on.

Tim Arlt:

Brad Kitchens will be our moderator tonight. Brad is the CEO of Scott Madden. He has over 30 years' experience as an Energy Management Consultant. We have some ground rules, they are posted. To provide comments, we ask that you come to a microphone, provide your name, the city and state you reside in, who your electric provider is, and any other affiliations you may have. Comments should be concise; our moderator may limit time if necessary to ensure everyone has a chance to speak. Please stay on topic, this is not a debate on climate science nor on past NPPD performance. Comments should be civil, please respect opinions of others and refrain from debating one another.

Tim Arlt:

At this time, there are three NPPD board members with us this evening. I'd like to introduce them. We have Marie Harding, we have Wayne Williams, and we have Charlie Kennedy. We also have Senator Stinner with us tonight. At his time, I'd like to invite Charlie Kennedy up to say a few welcome words. He is the sub-district five representative of this area.

Charlie Kennedy:

Hi. Charlie Kennedy, director of subdivision five, what we call God's Country out in Western Nebraska. Thanks for being here tonight, I know it's a busy week, school starting, I think there's a new season of The Bachelor starting which is very important to all of us. So, thanks for being here, they gave me a script, they didn't want me to do karaoke or anything like that so. This process works best when we facilitate productive opportunities for you to communicate, which allows us to listen. Your feedback is extremely important to us, and we welcome your candor and honesty.

Charlie Kennedy:

The board looks forward to tonight's conversation so welcome, kick back, make yourself at home. Thanks for being here.

Tim Arlt:

Thank you, Charlie. At this time, I'll turn the meeting over to Brad.

Brad Kitchens:

Tim, thank you. Good evening. Let me also offer my welcome to everybody, we're thrilled to have you join us and we hope to have an informative evening. As Tim said, he provided a good backdrop, this really is an outstanding opportunity for you as either wholesale partners or retail customers or retail customers of the wholesale partners, to provide some input into NPPD in this really important process. Looking at their IRP - integrated resource plan - that Tim alluded to, that's really NPPD trying to determine what's the generation mix, and generation portfolio need to look like over the next 10, 15 to 20 years. And with this notion of a likelihood of de-carbonization and managing carbon very similar, I say this every time, that every other utility is also of course addressing the same issue and set of questions. So, what NPPD and its board are doing are very, very similar to what other utilities across the country are doing. It's a very important topic and your input is very important to the process.

Brad Kitchens:

Two bites at the apple, at a minimum. One is tonight, to provide us any input, feedback, questions you have and then the second one is, and Tim mentioned this, there's a survey on NPPD's website. I took it a couple of weeks ago, it's a terrific survey, takes no more than 10 minutes. As I tell everybody, it's a series of questions and in between the questions, it provides a lot of information about that question. So, what are other utilities doing, what are carbon trends, what are risks of carbon, it really is I think, a helpful learning experience as well as a survey that will provide valuable feedback back to the NPPD leadership and board. Please, I encourage you to take that and ask your friends and neighbors to do the same.

Brad Kitchens:

The agenda is as follows. As Tim said, this is our fourth session, so we were at Norfolk, we were at Seward, we were at North Platte the last three nights and we had large crowds and they took every bit of three hours, primarily because of a lot of comments and a lot of Q and A. I don't know if tonight will take as long or not, we're certainly here until nine but we have a pretty hard stop at nine, but we'll see what the comments and questions may be.

Brad Kitchens:

We're going to take about 45 minutes or so and the two gentlemen to my left are going to provide a kind of baseline of what's going on in the industry. I appreciate that many of you work in industry every day, but many of you do not. So, it's an opportunity to make sure we all understand how the electric system works, and we also understand what some of the issues and risks are as they relate to carbon. And then we'll have about 15-20 minutes, up to 30 minutes for comments and questions to our experts. We'll take a very short break, we'll come back. Tom Kent, the CEO of NPPD, will then come up and share with everybody the current thinking from the board around its strategic directive on this important topic of the generation portfolio and carbon. It's subject to input, it's still a work in progress but he'll share with you what that draft, strategic directive is, and then again, we'll have as much time as we need up until nine o'clock for your questions or your comments as it relates to that topic. Okay?

Brad Kitchens:

So that's the lineup as we know it. We're going to do some polling throughout and again, the feedback from your polling will be helpful so let me set this up best I can. As we say every night, I'm sure the NPPD

folks in here have been to other sessions, this is just for customers and guests, not for NPPD folks. There are two ways to engage in the poll, the preferred way for sure is one the left-hand side is to login to polLEV.com. If you picked up this sheet by the way, all the instructions are on this blue sheet that you would have picked up at the front desk. So polLEV.com, if you just go into that it'll ask for a username, the username is NPPD999. Then it'll ask for you to register your name, just hit skip and you're in and you can just stay on that site for the balance of the evening, and we'll do a series of polls. If you prefer to text, that's your other option. You can text, you can see up there the number is 22333, and then in the text line you would put NPPD999.

Brad Kitchens:

It's easier and you can engage with these polls more effectively if you choose the first option versus the second one and again, the instructions are right here in front of you. So, let's do a quick test to see how everybody did. The question is fairly straightforward, of the topics that we are going to be talking about this evening, what is the topic that is most interesting to you? That you're interested about the risks associated with being a carbon emitting utility, that's A. B is you want to understand NPPD's carbon reduction goal or what it should be, or three, you want to understand, and Tim quickly alluded to this, the trade-offs and the considerations when you think about affordability, and you think about environmental impacts. If you had to pick one of those, I recognize they're all important, which one of those three would you choose as the primary reason why you're in the room today?

Brad Kitchens:

So, you can see in the lower right-hand corner, we have seven folks that have weighed in so far, hopefully we'll have as many as 15 or 20, so we'll give it another couple of minutes or another 20 secs or so. While you're doing that, you also have handouts. One of the handouts that you have in front of you are every slide that we're going to go through so to the extent that you want to take notes or anything like that or refer to those later, those are in front of you and also what Tim said also, on the website. We have nine folks in, we'll keep on going. I don't know how you have 50/50 with nine, I guess four and a half folks are for a couple of different things so maybe add 10 votes.

Brad Kitchens:

So, five of you are particularly interested in understanding better NPPD's carbon reduction goal and five of you are particularly interested in understanding the trade-offs of those very important considerations, to the extent that I can remember I try to share with each of the teams what the previous sessions yielded and just like this one now, has slightly more on that lower one. I think the previous all for the most part viewed that last category as the one they really want to understand and I'll tell you, that's where we're going to spend most of our time. When you talk about a future generation portfolio, you can't just think about one thing. It's not just cost, it's not just reliability, it's not just environmental impact, it's the combination and the balancing of all three of those items. Please keep that website open and we'll come back to that.

Brad Kitchens:

We have two speakers. First, we're going to hear from Dr Tom Reddoch. He's going to talk to use about the power system generally, and then we'll hear from Allen Dennis, and he'll talk to us about the business risks as they relate to carbon and de-carbonization. Let me introduce Dr Reddoch first, he's going to talk. He's a Technical Executive at EPRI, Electrical Power Research Institute. When you talk about research and development for this industry, it's widely known whether you're an IOU, public power co-operative, the go-to organization is EPRI. They're made up of scientists and engineers and other business leaders and on all topics around the power industry, and we have two gentlemen tonight. Dr Reddoch is a Technical Executive. He focuses on energy efficiently, demand response, electric transportation electrification. He also supports the Department of Energy on the next generation of electric power engineers. He's got a long list of accomplishments. He was a long-time professor at the University of Tennessee on this exact topic, so in the interest of time Dr Reddoch, I'll turn it over to you. Thank you.

Dr Tom Reddoch:

Thanks Brad. Wow, microphone is working right out of the shute tonight, good. Good work, that's what happens when you get a little practice, you can get serious.

Dr Tom Reddoch:

Over the next few minutes, my partner Allen Dennis and myself will share a few facts about what we know as the industry through the Electric Power Research Institute, and we are a 501c non-profit organization that works on behalf of the public and our focus is really to do R&D around the electric industry and with very much focus on how technology plays a role in changes. And if the industry was ever in change, it is change of the highest order presently, so a lot of our work has been directed in those efforts.

Dr Tom Reddoch:

Our simple mission statement, it's the words you will hear repeatedly tonight. This is something we adopted some time ago and the key aspects of that is we're trying to contribute to technology whereby electricity is an affordable, valued energy form that is reliable. In addition to that, we want those sources of electricity to have minimum impact on the environment. In recent years, we've added this other activity called resilience. Inevitably in a complex machine like an electric system, there will be failures and the goal is to be able to get recovery as quickly as possible. And ultimately at the end of the day, we want the entire process to be safe.

Dr Tom Reddoch:

At an independent organization, our results allow us to really focus on these various aspects that make up our overall mission, and our intent is to report facts as we find them and that remains our simple goal. Most and many of our efforts are done in a collaborative fashion and that collaboration is across industry and across consumers as yourself. There are several key strategic areas that we focus. If you look at this diagram, the two on the left is all about the carbon issue. Carbon as it is impacted when you produce power, but also carbon as when you consume power. In each of these areas, we're really looking to address carbon and its impacts overall.

Dr Tom Reddoch:

With those many changes that are coming to the electric system, especially renewable resources, it becomes ever more clear that the need for the electric system to be flexible because we're introducing new assets to the process and those new assets we are not able to control their availability and supply, and that means that we need to work on a very careful balanced process in order to ensure that we can have all assets in the system and to what level we can actually support them.

Dr Tom Reddoch:

And last, not so different than what we're doing tonight, part of our overall mission is education. It's education in the sense of supplying information to policy makers and other decision makers, such that they're best equipped with a full data set to make judgements and trade-offs on their choices. The electric system does center on you, the customer, and the entire process it has been built around is to actually support the consumer of electricity.

Dr Tom Reddoch:

We talk to this combination product as the integrated energy network and that means there are many different assets that make up the electric system, and I thought about this. I failed to mention this last evening and it's at the top of my head. One of the difficulties about making all these pieces marry is the age of these devices. There are devices that are 6 months old, of the newest technology, to things that are 75 and 80 years old. Making all of those pieces work together is quite a challenge, and we're adding more and different assets to the overall mix. Renewables will play a major role in our going forward discussions, also the role that energy storage would also play into that as well.

Dr Tom Reddoch:

But perhaps one of the more significant elements that makes up this network is how computers and communication are becoming integral with the entire process. This creates what some of you may be familiar with the term, smart grid or smart devices, could be the smart thermostat in your house or it could be the smart controller that's out managing on the electric system. All of those together make up this system. Let me just share a couple of quick history items. In the beginning, electricity really began to be a breakout energy choice, that the people most identify with Thomas Edison. He's the guy who invented the light bulb, and that was just the first of many electric devices to come forward. His system was based on so-called direct current. That's like what you'd get out of a battery, what you'd get out of a solar cell.

Dr Tom Reddoch:

The problem with that formation of the electric supply is that you can't ship it very far. The current is high, there are a lot of losses in the system and when you have these losses, it makes it intractable to be able to produce in large blocks and be able to share. Consequently, along came a second investor Tesla. You know, he's got his name on that new electric vehicle that's sporting around. He brought in alternating current as an alternate way of looking at it. What's the value of being able to move from a DC system to an alternating current system? The most significant part is that you can ship power long distances, and by doing that you can ship it with a very small amount of losses and therefore it made it tractable to connect

these pieces. In the end, AC won out. One device, the difference maker was a device called the transformer. That allows you to increase the voltage and thereby reduce the current and therein is where you get the savings.

Dr Tom Reddoch:

Just a couple of other quick items to note, Federal Government became serious about regulating interstate electric transmission in the middle 30s and that really became a very crucial part because electric systems really grew in terms of their connectivity. The main reason that you connect systems together is to lower cost in terms of sharing your resources with your neighbors, and also for reliability. These are the key items about interconnecting processes, and the Rural Electrification Act certainly impact this community and many other rural areas because what it did is it brought electricity out to points where it was not occurring with the investor-owned arrangements that were in place. As a part of that expansion, you can see over here under Rapid Electrification, in 1970, MPBD was born to be a part of the supply system. The last item I want to point to is just below that, is this PURPA pass in 1978. It's the Public Utility Regulatory Policy Act and what that does is that if you own generation, it essentially gives you a guaranteed market out into the electric system, and that's really valuable if you're going to make that investment. You'd like to be able to think you could actually do something with your product.

Dr Tom Reddoch:

Let's talk basically about how the electric system works overall and since some of you have been here before as you know, I like to start on Item 6 on this diagram rather than Item 1, and Item 6 is because as consumers, that is your part in this show. We bill this process around in order to be able to get electricity to consumers. It's really made up of two primary parts, producing electricity and delivering electricity. Item 1 is that there are a variety of different ways to produce it. I have another slide coming up in a moment, I'll elaborate on some of those choices. The key thing is that in Item 2 and really in Item 4, these are what are known as substations. They have those transformers, those items that allow you to boost the voltage so that you can ship over Item 3 which is the transmission system. Think about the transmission system like interstate roads. It's items that you can move a lot, in our case, a lot of energy. In the case of automobiles, a lot of cars.

Dr Tom Reddoch:

When you get to the point where you would like to start actually using it at the consumer level, that's really what 5 represents. Before that, you step the voltage back down. Another way to think about voltage is if you think about a water system, it's the pressure. It's really what drives the arrangement. These are just bullet points that summarize each of these. Let's look briefly at the types of power plants that make up the

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Tom:

[inaudible 00:29:00] at the types of power plants that make up electric systems. And I like to divide these into two categories. One is where the fuel goes directly to electricity; the second group is where fuel goes

through some intermediate stage before you make electricity. So, examples. If you're going to do the in-between step, the typical thing that's done is that the fuel is burned, and you form steam. Steam, in turn, is used to drive a steam turbine that turns a generator and produces electricity.

Tom:

And if I look at this diagram up here, natural gas, nuclear, coal, all go through the steam route. So, you form steam by burning those fuels. Natural gas also can be used directly in what we call a gas turbine. If I look at wind, solar, and hydro, these are all directly produced, going from the fuel; sun being the fuel for solar, wind for wind turbines, and water for hydro facilities. Of these, in terms of contributing to our electric supply, hydro has been with us a very long time. Among the earliest. Also, it was used as a mechanical device at one time or another. We refer to wind turbines as opposed to windmills, but at the end of the day, the principle isn't different. You're using lift of these blades in order to get rotation.

Tom:

What you also see on this diagram is that we've identified some of these resources scattered around the state, and the reason we did that is that we just want to let you know that all of these things actually have a name. They're not just general characteristics. The transmission system and the substations, those two, again, work hand in hand. What is the transmission system? It's those big towers you see. It's the ones with the big wires. It's the ones that haul large amounts of power. The substations are vital because that's where you step it up and down, in order to be able to get use out of the power. And, again, the distribution system. I'll just call those the little wires. The short poles that you see out there. Usually, it's not unusual to see the distribution power poles having telephone or communication cable on the same pole.

Tom:

So, again, what are we trying to do? We're trying to take all these disparate assets, roll them together, and make them work in a common way. And when you look at this diagram on the left, these are the larger producing devices. Their outputs are collected and put into the transmission system, and they're taken down to the point where you can use them. So, things on the right are all about using electricity, whether we're talking about residential, commercial, or industrial applications. But if you also notice, at the very bottom, there's a solar panel, and that is to signal that also, at the consuming end, today, we actually have the ability to produce power... And if you remember [PURPA 00:32:21], you actually can produce that power and have a market for it. And that's very relevant.

Tom:

Also want to underscore that, when you're working with [NPPD 00:32:30], you're not in a situation where they're alone, thereby making you alone. They're actually a part of a larger aggregate of power-producing entities, and connecting links, transmission lines, that tie them together. And that is the Southwest Power Pool. And through the Southwest Power Pool, NPPD can access other resources, and actually share your capability. I think as we get through some of the discussion tonight, we'll learn that this really works both ways. And that's what is typically done when you're sharing with your neighbor.

Tom:

So, I want to pick this theme up and pass it through one more time. These are really the four principles that we are sharing with you, about how an electric system is put together, and what the trade-off decisions are in that process. These four items: reliability, affordability, resiliency, and sustainability. Again, sustainability and environment can be swapped with one another. They're coupled. You affect one, or you change one, you change the others. And what the decision process is about is, "How do I trade these items off?" And that discussion theme, we will carry through the entirety of our conversation tonight.

Tom:

To bring this discussion to closure, let me just share a little bit about the business of how we transact in the electricity business. Many of you, your only element of connectivity is through your electric rate. That's how you see your engagement in the process. The electric rate is simply the financial instrument to be able to set up a buying arrangement between you and the electric supplier. The principle of the regulatory compact was put in place in the early 1900s, and this was desired in order to guarantee that all customers could be served, and that there be a process whereby the cost of those transactions could be recovered.

Tom:

So, electric utilities were given a franchised area that they serve, and, in exchange for that franchised area, and the notion that all customers would be served, that utility would have an opportunity to collect the cost of that implementation, and that they would also get a fair rate of return on the investment to actually carry that out. And again, that process is reflected through the electric rates. And with that... I know that was a little quick. There will be opportunities for you to query us as we get further in the discussion. But at this point, Brad, we'll turn it back to you, and we'll go.

Brad:

Thank you, Tom.

Tom:

Yes, sir.

Brad:

All right. Two quick polling questions, just to see what your thoughts are, based on what you've heard thus far. So, this is a ranking question, so you can do this if you're in the [poll-EV 00:36:12].com, not if you're texting. If you hover over each of those things, you'll see an up and down arrow. If you had to take those three elements and rank them, in terms of your prioritization, one, two, and three, how would you rank affordability and cost, environmental impacts, and the combination of reliability or resiliency? So, we'll look at that quickly. I see 10 logged in already, so... 12. Okay...

Brad:

So. Reliability/resiliency, number one. It looks like it's pretty close, neck-and-neck, between environmental impacts and affordability, based on the switch right there. Again, just informing you, from the other sessions: same answers. Reliability and resiliency was overwhelmingly the number-one selection in our three previous settings. And just like this is going back and forth between affordability and environmental impacts, those two were pretty much a push across the previous three settings. So, very similar results to what we have here.

Brad:

One other one. So, when you hear the word "decarbonization", before... The next topic will be on this, on decarbonization, the next presentation. Before we get to that, when you hear that word, if you had to come up with one word that comes to mind... good, bad, necessary, unnecessary, curious... what might be the word that you would associate with this notion of decarbonization? This will generate a little word cloud, and those words that are larger within that word cloud are the ones that receive the most votes. And again, I'll share with you what I can remember from some of the other ones.

Brad:

That's 13. Just going through a process of screening these. We got to make sure there's no inappropriate language in there. So, there you go. So, "expensive". Oh, interesting. So, again, the two largest votes, given the size of words, would've been "expensive" and "necessary". So, one might argue maybe either side of the same coin. So, last night, the number-one word was "expensive". The night before, I think the number-one word would have been something related to "necessary". So again, we're getting a lot of feedback, almost bimodal. Many feel strongly in favor, and as you might imagine, many feel strongly, perhaps, not in favor. So that's what we look like today. Again, this next topic will be on decarbonization. When Tom talks, it'll also be on decarbonization. So let me keep us moving.

Brad:

So, the next speaker is Allen Dennis. He's going to talk to us about business risks of carbon and decarbonization, with a focus, once again, on the combination of affordability, reliability, and environment impacts. He's the Senior Program Manager at EPRI. He started and leads EPRI's Electrification Program. You know how I talked about utilities being very focused on IRPs and generation portfolio? Well, the other thing that really focused on is electrification overall. So that's a big topic, and he leads that for EPRI. He's got 40 years of experience in the industry. And with that, Allen, let's turn it over to you. Thank you.

Allen Dennis:

Thanks, Brad.

Brad:

[crosstalk 00:38:54] there.

Allen Dennis:

So, I'm going to go through the decarbonization... Identify some of the risks that NPPD, other utilities, are facing, and really dive in a little deeper than the higher-level you heard from Tom. I want to focus on five areas. The first one is, what's changing around energy systems today? The second is, what does it mean around decarbonization? You hear all these terms out there, and it can be a bit confusing. So, I'm going to try to level-set a few terms around decarbonization, net zero energy, renewables, to give you a flavor around those. And then what's happening around the policy side? A lot of dynamics are happening right now on a regulatory side, both in the US and internationally.

Allen Dennis:

And so, a lot of changes. What are some of the potential risks around decarbonization? And the fifth area will dive into a little bit of where NPPD is now, where the US is now, around some of these resources, to give you, again, a flavor of what's happening in the industry. Four areas to focus on. One is the energy supply, which is, again, as the name denotes, how the power is generated. How the systems are integrating together. What community involvement is really focused on these days, and then how you look at economy-wide decarbonization. And I will dive into each one of these here a bit more in the presentation.

Allen Dennis:

So, energy supply. So, when you talk about getting power to customers, you certainly want to ensure that you have low-cost access. So that can be generation close to where your customers are at; it can also mean from a regional transmission mix. What kind of transmission lines you have to move power from one location to another? And it varies, actually, dramatically across the US. And then how is the evolving societal priorities changing? It's a very important topic these days, and so that, again, we'll explore that here in a second.

Allen Dennis:

If you look at the US generation mix, from 2004 to 2019, you see, by this chart, coal is decreased, as far as its output. Coal plants have been shutting down. Natural gas has been increasing. And even the natural gas industry would tell you there are transitional fuel. Nuclear has stayed about constant. Hydro is about constant. Wind is actually substantially increased, if you look at a percentage basis. Solar, likewise, although it's still not a huge percentage, but it's growing. And then you can see wood and biomass.

Allen Dennis:

And so, of those, if you look at the pie chart here, from '04 to 2019, you see, again, a few of the areas that you focus on. You can see how coal is reduced from 50% down to 23%. And again, this is the US generation mix overall. You see how natural gas has gone from 18% to 38%. And, again, you can look at the others of being... How wind has increased, basically from about zero in 2004, to 7%. So, you can see the trend, which is, I don't think, much of a secret. You're seeing more renewable generation occurring in the US generation mix.

Allen Dennis:

And so, as I mentioned earlier, coal decreasing, natural gas increasing, nuclear and hydro about the same, wind and solar are also increasing. So where is NPPD? If you look at NPPD, in 2005, about 30% of the generation, 29.5%, was from carbon-free resources. If you look at 2020, it's gone up to 45% carbon-free resources. And so, from this, you can see a reduction in coal, an increase in wind, and also an increase in nuclear. And so, to give you an idea of where, again, here locally, some of that power generation supply is, this will help start framing the discussion around decarbonization.

Allen Dennis:

So, you look at integrated systems, and as Tom was mentioning earlier, if you go back 100 years, 120 years, the way power was basically provided to customers was you would have a central plant: a coal plant, a natural gas, some central plant. And then typically what would happen is you would have a transmission line that would move that power from that central plant to end-use customers. And that certainly has been a very efficient model, and even today, many times, very cost-effective to do that. But that dynamic is changing a bit.

Allen Dennis:

So, if you look at energy efficiency and reliability, it's key to an integrated system. You look at the flexibility. And security that's involved with the power grid has been an enormous focus. Again, not only with utilities, but as us, as a researcher, how do you ensure security around the systems? And then customers have been much more engaged than... I started, as Brad mentioned, 40 years ago. And certainly, I started with the utility, actually, in Colorado. And we engaged the customers. Let me tell you, in many cases, they're very engaged, like many of you are with your utilities, and becoming more so. Which is a good thing.

Allen Dennis:

So, when you look at the modernization of the grid, and you look at... It was brought up earlier. You have a smart thermostat in some homes now. You have electric vehicles that you can charge. And then we've been doing research for, what, five years now on how that car, during certain times, could actually run the home. If your peak... You had, maybe, outages, or you had peak power prices, those kinds of things. The end-use piece, the technologies that are in your home, and in businesses, and in industries, are now playing a greater part in the operation of that system. Incredibly complex. You're past the, "Oh, we're going to build a power plant and serve the customer." Now some of the things the customer has can actually help run the system.

Allen Dennis:

And so that is a business risk/opportunity, is to keep up on what's happening there. How do you leverage that? How do you optimize that? And again, from a risk standpoint, it's incredibly complex. And it's coming at lightning speed. Just look five years ago at some of the products that you could have for your home. And now, around your home automation and other things that are happening, even just with electric vehicles, and you're seeing much more options. Many more options that customers have. And each of those comes with an integration into the grid. So, at the end of the day, it's becoming more complex. The power flow could actually be bidirectional, two-way, not just the utility serving the customer.

Allen Dennis:

And again, one of the other things that folks are working on now is self-healing grids. So, we do research on this. So, let's say you have a contract route there that cuts a line, and you have this grid that says, "Oh. I see where that line is cut." And maybe in the past you had to send out a crew, and you go to a switch cabinet, and you change things around, and you try to keep people in service. Now the system, through automation, will do that, to keep people in service. Pretty cool, right? But all of that is a business risk, to make sure that it works properly, it's reliable, it has the security measures. All those things that utility and NPPD and all your local power companies are looking at every day. And so that's something that, again, is exciting; but with that comes flexibility of the grid.

Allen Dennis:

Another thing is community. So, every utility in the US wants to serve its communities well. I have never, and I've worked with a lot of utilities, never ran into a utility that says, "Eh, I don't really care about serving my customers." Every utility is committed to serving the customers the very best they can. And all of the points: low cost, high reliability. And so, one of the things that's happening now, you're seeing more and more with a lot of utilities, is certainly the environmental focus, but also social justice and economic justice around the power grid. Where those lines are located. Where do substations go into?

Allen Dennis:

And all of this, now, is becoming more and more of a focus with customers. A business risk. Right? It adds another level of complexity that the utilities are working with. And again, risk or opportunity to leverage more customers. Because, at the end of the day, the utilities want to do the very best to serve those customers, and so you're now looking at more on how utilities can be part of those communities from environmental, social justice. You look at air. You look at land. You look at water. You look at public health. You look at safety. All of those things are playing a greater, greater part of supplying power to communities with those utilities. Again, business risk.

Allen Dennis:

You look at economy-wide decarbonization, and if you look back again, the utility I started with in Denver, we were doing energy-efficiency programs in 1985. So, working with energy efficiency, putting in energy-efficient lighting, and smarter thermostats, and you're doing more control systems on business HVAC systems. All of those have been around for 40 years. They certainly have increase around their efficiency and their reliability. Cleaner electricity. You look at wind, and you look at solar, you look at nuclear. All of those have been around, and certainly have been a focus around clean supply.

Allen Dennis:

So, what's happening today? And it's those things that I mentioned, is, how do you get an efficient electrification? How do you target things that, at the end of the day, quite frankly, when I worked with utilities and our customers, and certainly with industrial and commercial customers, even residential... Customers want a payback. Right? They're looking to put money out; they want to make sure they get a

certain payback on it. And then, along with that, how does that impact environmental goals that they may have? And so, you look at electric vehicles. You look at some of the smart heat pumps, and the heat pump technologies are just amazing today. You look at heat pump water heaters. All those end-use technologies that are getting better and better and better, and continually, at lightning speed. And so, again, how you focus on this.

Allen Dennis:

And then the last area, which Tom touched on, also, is new fuels. So, I mentioned natural gas, right? I mentioned solar. I mentioned coal, a few others. But there's now hydrogen. There's ammonia. There's other low-carbon fuels that we're doing a lot of research on now... interestingly enough, with some of the oil companies... around how you can generate these low-carbon fuels. So now you add that to the complexity around all of this. You have a lot of moving parts, and each of these have a business risk. And so, all of this, as you go through it, is, how do you manage that, so you make sure that, again, you're optimizing the system?

Allen Dennis:

So, I've thrown out a few terms, so let me just go through this quickly. So, we've talked about renewables. And if you look at renewables, and you say, "I want 100% renewable power." Okay. Typically, what that means is you're going to have something that was maybe generated by wind, by solar. You may have some batteries to back that up. When the sun isn't shining and the wind ain't blowing, you're going to need it stored someplace, right? To use it? So, you typically have that. Or, again, you're starting to look at hydrogen. And one of the ways you can produce hydrogen is you can take water, and you can split the water, H<sub>2</sub>O, into hydrogen and oxygen. And so that's one way of doing it, and there's a number of ways you can do it. But that...

Allen Dennis:

So, all of your power is renewable, because it was... It didn't take a carbon resource to provide that power. Carbon-free is if you add nuclear to the mix. So, you have everything that was renewables; you add nuclear to it, and nuclear is carbon-free. And so, now, that would be one of the definitions around carbon-free. One of the most popular definitions now is net zero carbon. How many folks have heard of net zero carbon? Yeah, we got a lot! And so, it is the buzzword, right? It's like, everyone's targeting net zero energy, and net zero carbon, and it means potentially different things to different people. But basically, it means that...

Allen Dennis:

Let's say I have an industrial facility, and I have a natural gas boiler that produces steam. And that natural gas is a fossil fuel, and I'm burning carbon. And I look at how much natural gas I'm burning in that boiler, and I say, "You know, I want to be net zero carbon. So, what can I do with the rest of my operation that maybe is using carbon today, that I can change to get a credit?" Maybe I have a forklift that's running on diesel, and I'll convert that to an electric forklift, and I have renewable power serving that electric forklift. Maybe I have a fleet of trucks, and I can convert those trucks to an electric truck. Maybe I want to...

Allen Dennis:

And folks have invested in forest land. And there's a wide variety for carbon reduction. But the key is, at the end of the day, when you go through the calculation, you look at how much fossil fuel you've used, you look at what your offsets are. So, the question, now, actually, you would say, "Allen? How do I start that?" Right? So typically, what happens, with most businesses, is they say, "We are going to set a stake in the ground, and we're going to say, 'We're going to figure out how much carbon we use in the year, starting in 2015.'" And pick a year. Whatever year you want. It sets the benchmark: "This is how much carbon we use." And now, typically, a game plan of "how do I get to net zero carbon"...

Allen Dennis:

And typically, you find, with most businesses, and, as Brad mentioned, utilities, and everyone's kind of in the same boat, the magic date is the year 2050. And you hear the "2050" over and over and over again. And so that typically is what you're seeing. So, then you would say, "How do I get to net zero carbon by the year 2050? What are all the things I can do?" And that's where you end up with net zero carbon. So, we're not alone. And, if you certainly look at the industry of what's happening around policies and carbon risk around this... And, again, another business risk.

Allen Dennis:

Many countries are establishing maximum carbon emissions. You look at a lot of European countries, Far East countries, they're going in and saying, "Here's what our maximum carbon emission's going to be." You look at carbon tax. In other words, if you use carbon, like a lot of utilities do, then regulators are looking at, how do you put a tax on that? To value... And the idea is, that tax, then, is a proxy for what the environmental detriment would be of that carbon. And, again, I'm not on either side; I'll let folks decide that. It's just, this is a mechanism, one of many, many, many mechanisms that people can do around putting together carbon and other co-

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Alan:

... putting together carbon and other codes and standards around... that people have looked at for carbon reduction. Again, business risk. You look at the Paris Agreement, and one of the keys around Paris Agreement is it got a lot of countries together, and they were targeting a two to two-and-a-half degrees Celsius increase, and there's a very elaborate weather and climate model to go with that. And the key is it starts calculating and tracking and recording emissions and carbon and impact, and it starts setting that benchmark, right?

Alan:

And so, a very important thing because anybody choosing carbon, now you have a potential business risk. If you are an industrial facility, even down to your home or utility, it starts looking and saying, "How do we then start evaluating that?" And this isn't really new. I mean, even in the U.S., California has had some kind of carbon trading. You look at the Northeast, they've had some carbon trading. The numbers aren't...

I'll just throw out the numbers, but you're looking at probably about \$30 a ton. Don't get too concerned about the number, but you start in seeing some of the projections are that that price per ton of carbon would increase. So, if it starts increasing and you use carbon, a business risk, right? That potentially can cost your business. And you may have to offset, you may have to reduce, but it starts framing what some of this risk is around carbon and de-carbonization.

Alan:

And so, you're saying, "Alan, I see this, and I hear this," and companies are getting involved. Every day you start hearing more and more companies around what they're doing for carbon, right? I mean, you name any major company, they probably have some kind of sustainability report. And here's an interesting fact. 90% of the standard [inaudible 01:00:44] 500 companies have sustainability reports. And it's becoming more and more commonplace, even in the financial terms, right? How are they trading? What's what they call their ESG plan? Environmental governance plan for those companies. And you look back in the year 2011 and only 20% of companies had it. Huge increase around environmental focus for companies. And then, along with that, 163 Fortune 500 companies have climate targets, 23 countries are represented with the Fortune 500, and again, you look at multinational companies, and they're really putting a lot of pressure on green energy. And you say, "That's all right."

Alan:

Before I was with EPRI, I was working for the utility in Kansas City, and we served in and around Kansas City and Missouri and Kansas. And six of our top 10 largest customers were European-based, and they were on us all the time around what's our carbon? What's green power? Because they had to report back to their corporates on the power that they were getting and how much carbon was impacted by that. And so, right or wrong, that's what it was because, again, from a European standpoint... And this was 10 years ago, so you're seeing more and more pressure as a business risk from utilities from customers that have plans, that have goals that they're wanting to meet. And again, I have never met a utility that didn't want to serve its customers and do that effectively and responsibly, and so it's listening to those customers, seeing how you can meet the customers' needs, also how the utility can operate effectively.

Alan:

So, with that, again, the purpose of this discussion, NPPD, excuse me, done a great job. 30% carbon-free, now 45%. You look at, again, what's in the future. And that's this whole plan of what's next? And so, just in summary, it comes back to these four areas, right? You want reliability, you want affordability, you want resiliency, you want to keep the lights on, right? And you want sustainability. And all these are in balance. You don't get something for nothing, right? So, it's always this trade-off. It's always what is the risk? What is the reward around all this de-carbonization? Again, to leverage it and making sure that as a utility, as customers, everyone's moving together down the road. So, you're seeing, again, more and more of this focus, and it will continue, and it is coming at lightning pace.

Alan:

All right. Thank you very much.

Brad Kitchens:

Thank you, Alan. Alrighty. As you might predict, couple more polling questions. So, the topic there of course was carbon, carbon risk, something that probably cannot be ignored. And so, given that, again, three choices, based on what you've heard when we hear about de-carbonization, what are you most focused on? The risks of doing nothing or very little or not keeping pace? The risk of not knowing how we're going to get there. Or C, I'm not that concerned at all about carbonization. If you had to select one of those three, which would you select? And I don't remember what the other sites weighed in on this topic. There's 14. Think we're...

Brad Kitchens:

All right. So, this risk of doing nothing kind of gets back to that "necessary" word-cloud word—is one of the concerns that you have, and then second behind that would be the notion of, "I'm not really too concerned about the topic or the issue of de-carbonization."

Brad Kitchens:

So how about this question. Again, I take you back to this quickly. He shared where NPPD is today, a nicely diversified portfolio, made good progress over the last many years with respect to its carbon-free energy component and that footprint. So, given that, what do you think about NPPD? And have they done enough to diversify their energy resource mix? A, too ambitious in your judgment. B, making good progress, but not too ambitious. About the right pace is C. And then on the other side of the coin, not doing enough, but not too far behind. Or way behind. Or you simply don't know at this stage. Where would you weigh in on this one?

Brad Kitchens:

We have a different number each time. Interesting. Seem like we're leaning more toward the expensive than the other one, but many folks here think the progress thus far has been too ambitious, although there's, if you combined the fourth choice and the fifth choice combined, it would be 46%, and that would suggest we are behind. So again, kind of that bimodal, right? Half or so kind of feel like we're doing too much and too fast, and maybe perhaps the other half, just the other side of that same coin.

Brad Kitchens:

Let's take a few minutes, and we're happy to hear your comments on this topic that you've heard so far. Again, we're going to hear from Tom in just a few moments and specifically address NPPD and address your questions there, but anything on your minds you want to share with us in terms of thoughts on this topic, advice to NPPD? If you have a comment, there's mics on either side. Again, we just ask that you walk up, provide your name, your city, and your power provider. I'll also ask, although we don't have a full house, that brevity is helpful. A few times we had a few speakers that were reading long scripts. I would submit that after about three minutes, you're probably not being listened to like you think. So just a brevity would be helpful. But any thoughts, any comments from anybody at all on this topic, we'd welcome it.

Brad Kitchens:

Yes, sir.

### 3.4.0 Public Comments

Dustin Rief:

Hi. Dustin Rief, city manager of Scottsbluff. Just one question on the resiliency side, from NPPD's perspective on they handle cyber security [inaudible 01:07:02] and that kind of stuff. I know there's been some recent cyber-attacks and those kind of things in other areas. Has that been a strong focus on kind of converting into a stronger security network?

Brad Kitchens:

And your question's specifically about NPPD's doing around cyber security?

Dustin Rief:

Correct.

Brad Kitchens:

Would you mind if we just waited till Tom was up here, and he can either address that or get one of his colleagues to? But we'll make sure that's addressed. Thank you. Cyber's a pretty big deal, so I'm sure it's getting ample attention after Colonial Pipeline incident from just a couple months ago.

Brad Kitchens:

Yes, ma'am.

Anne Buckman:

[inaudible 01:07:41]. I had two really short questions.

Brad Kitchens:

Of course.

Anne Buckman:

The first one is where does distributed power come into play in terms of how you want to... First of all, Anne Buckman from Chardon. Not really associated with anybody except that I work for Citizens' Climate Lobby as a volunteer.

Brad Kitchens:

Yes, ma'am.

Anne Buckman:

First one is, how are you thinking about distributed energy sources fitting in to the grid as being part of the portfolio in the future? And the second one is how are you thinking about getting more farmer buy-in by using carbon sequestration as one of your carbon outsource? Is that an option to be used as you're looking towards a sort of net-zero type of future?

Brad Kitchens:

To the second one, again, I'll let maybe Tom speak to that because that's come up before and I know that we've got a good answer for that. But maybe on the DER, the distributed energy resource, Tom or Alan, you can talk about how that kind of fits into the model.

Speaker 4:

So, it's very interesting. I didn't say this in the full history, but if we go back to around 1915 when electricity started to emerge, everything was decentralized in that point in time. And what we discovered is that over the course of the next, oh gosh, 80 years, we discovered that through sharing of assets and actually building large, centralized producing power was the best economic route.

Speaker 4:

What we've had in the last few years are really two things have changed the picture. One is that there's been significant advancement in technology that really allows us to reintroduce distributed assets. So distributed assets absolutely has a ever increasing role in our future electric system makeup.

Speaker 4:

The second item is regulations. There have been a lot of regulations that have now really allowed distributed assets to become a part of the overall mix. And you may recall on that slide I referred to the PURPA Act of 1978, that seems like that was passed a long time ago, but its value really has seriously emerged in most recent years, because the technology really has got devices that we can actually buy at a reasonable price and make them a part of this solution.

Brad Kitchens:

I will add, distributed energy resources, DERs, in some parts of the country, California, for example, it's a meaningful part of the mix. So, it's 10, 20, 30% of the overall supply mix. So, it's not insignificant at all. So, a lot of the investment that Tom and Alan talked about on technology that's going into place that's around advanced distribution management systems or distributed energy resource management systems, it's so the utilities can engage with DER technology, have visibility into what's taking place, and make it part of the overall ecosystem, where before they couldn't. So, it's a very important element.

Brad Kitchens:

Yeah, Alan.

Alan:

And let me just add. So probably one of the leading states around DER is Hawaii, right? Because they have very specific goals when they want to be 100% renewable. And all the solar and all the distributed resources, so we do an extensive with Hawaiian Electric on what happens when a cloud comes over to the voltage on the system? So, it's all the mechanical things also. It's the reliability, it's the resiliency of the system. And so, you want to make sure that that resource is an effective resource, cost-effective, but you also want to make sure that it's reliable and it's not... You're managing the grid appropriately. So that's a prime example where everyone can learn from that, right? And that's some of the research that we do. But it's exciting, right? It's a whole different model. And so that's a very specific example of where DER has been very integrated into the utility's supply [inaudible 01:11:55].

Brad Kitchens:

Tom will address your carbon capture and sequestration here in a moment as well. Any other comments or questions? Yes, please. It's a long quiet walk up there, isn't there?

Jane:

It is. Jane [inaudible 01:12:12] Scottsbluff, Nebraska. I guess my question is in the resiliency part of this. One of my confidences of NPPD is that it's publicly known. And after we saw the debacle in Texas, I would like to know if we have some assurance that we will continue to be a publicly owned utility and not be sold to private interests.

Brad Kitchens:

Well, I think that's a high unlikelyhood. I'll let Tom address the likelihood. I will speak quickly to the Texas experience, and again, Tom may want to speak what happened in your local market. But Texas is a separate market. It's called ERCOT. And it was a debacle. That's probably an understatement, but the primary source of their problem was the extended cold period of course. They did not have winterized natural gas systems, so both at the wellhead, the pipeline, all the way to the end user, whether it's industrial or retail, and it froze.

Brad Kitchens:

And so, they had about a 70,000-megawatt shortfall, which is enormous, and about 50,000 of that was the gas system. So, some people inappropriately attribute the problem in Texas. Again, I'll let Tom address SPP to renewables. And although they also performed relatively poorly, the primary problem was the gas system. But in terms of no longer being a public power, again, I can't address that, but I'm quite certain that's a low likelihood, but we'll let Tom speak to that. But thank you for your question. Good point.

Brad Kitchens:

Since we're lining up questions for Tom, I might suggest... We were going to take a break, and I'll just look for a quick show of hands, just to keep things rolling and so that you can hear from Tom, I might suggest we forgo the break. If you want a cookie and water, just obviously make your way up there. But let's hear from the CEO of NPPD. He can talk to a couple of these questions that have come up. I'm sure you'll have others for him. But he can also share with you, again, the strategic directive that the leadership team and the board are beginning to think about subject to your comments and input. So, if you're okay forgoing the break, Tom, I'll just roll directly to you.

Tom:

I am if the group is.

Speaker 2:

I saw more nods in favor than opposing, so it's all yours.

#### 3.4.1 Discussion Draft of SD-05

Tom:

All right. Terrific. Do I have the right one? Okay. Well, again, thank you... Jeez, I don't like that screen. Thank you for all being here tonight. Really appreciate the opportunity to talk, and I know as we mentioned at the beginning, there's a lot going on in everyone's lives. For you to take a few hours out of your evening to come listen and provide your input to us as we consider some of these important issues that impact how we serve you is greatly appreciated.

Tom:

I want to get to a couple of the questions first, and then I'll talk about our current discussion draft of a what we call a strategic directive. I'll explain that in a second, on our power supply as we look into the future with regard to carbon emissions.

Tom:

So first, public power has been around in Nebraska since the 1930s. It is George Norris, former congressman, former senator, is considered the father of public power nationally and in Nebraska. He brought a lot of new ideas into being in Nebraska in that timeframe, the Nebraska Unicameral was something that he supported and pushed to the Rural Electrification Administration, which was on the timeline. He was instrumental in getting those rules and laws passed in Congress to ensure that power, which is so important the ag economy in Nebraska and so important to a well-functioning productive economy in the country, was easily accessed by all. And a lot of our wholesale customers are part of or formed from that initial Rural Electrification Act, the rural co-ops came out of that process. George Norris was also the father of the Tennessee Valley Authority. So, he has his fingerprints, local Nebraska guy, on a lot of things with public power.

Tom:

In our legislator in the '30s I should know the exact year, passed what's referred to as an enabling act that created the public power structure that we have today. And we are all, almost all of the public power entities in Nebraska are of one of three types. Well, all of them are one of three types. Four types. We have municipalities like the City of Gering, which runs its own municipal utility. We have public power districts like Nebraska Public Power District, like Roosevelt Public Power District, like Chimney Rock Public Power District. Now Roosevelt and Chimney Rock are both rural power districts, but they're formed under the exact same statues that form Nebraska Public Power District and its predecessors.

Tom:

We have cooperatives, PREMA, Panhandle Rural Electric Membership Association is a cooperative formed under the cooperative acts. Couple of our large customers, but our largest customer in terms of a collection of rural distracts is the Nebraska Electric Generation and Transmission Cooperative formed under those same rules. And then the other form of public power agency we have in Nebraska is what's considered a joint action agency, the Nebraska Municipal Power Pool, Municipal Energy Agency of Nebraska, and they work and pull resources for a bunch of miniplate utilities across the state.

Tom:

So that's kind of the history, and that's where we came from. And when these laws were passed in the '30s, the legislature set up a structure that allowed these new entities, the public power entities to purchase and potentially condemn the facilities, the investor-owned utilities that were in the state at the time. And so, if you go back in history and you look at the predecessors to Nebraska Public Power District, and I hope it's still there. I used to work in the building. But in downtown Scottsbluff, there's a four-story building on the corner that has Public Power engraved in the granite on the front.

Speaker 3:

It's still there.

Tom:

It's still there. Yay. Okay.

Speaker 3:

[inaudible 01:18:35].

Tom:

Terrific. Well, that's good news. That is the start of the electric power system in this part of the state. And it was originally an investor-owned utility that was purchased by one of our predecessor companies,

Consumer Public Power District. And so, public power is woven into Nebraska, and it's got a long history providing low-cost reliable electric service to its customers.

Tom:

Ultimately, our continued success depends on us continuing to meet that mission of low-cost reliable electric service to our customers. And ultimately, the authority that has the say on what that structure looks like is the 49 people that you elect to represent you in Lincoln. Because we are structured under the statutes of Nebraska. And it's the Nebraska legislature that provides the opportunity to change those. And so, again, we're about serving our customers, we're owned by our customers, and it's a structure that served us and the state very well. I don't see that happening any time soon where that could change, as long as we continue to deliver on our mission.

Tom:

So next question, cyber security. Yeah, cyber security is a huge issue. If you look at not just us, but anyone in the utility industry, the importance of cyber security has really ramped up over the last decade or so. The digital technology that's come to make it easier for us to do these kinds of things that we're talking about today integrate all these different resources, integrate distributed energy resources, run these systems more efficiently, rely on digital technology to do that. We refer to it as operations technology, which is a little bit different than IT technology. It's machine controllers, those kinds of things. But at the end of the day, it's all computer-based, and so we have invested as an industry, and as NPPD as a specific utility, a lot in ensuring that our systems are protected against intrusion from bad actors in the cyber world.

Tom:

You do that in a combination of ways, and you do that with multiple layers of depth and stuff. We do that with a lot of training. We spend a lot of time training and educating our teammates, the members of our organization on how to be healthy users of things like email, and how to look for people that are trying to get into your system by spoofing or spamming someone.

Tom:

I was in a board meeting three months ago, talking to the board of directors, and some of my teammates were getting texts from me, saying, "Hey, I need some help." Right? Well, guess what? I wasn't sending texts. But that happens all the time. And so, a lot of this is education.

Tom:

It's an effort that the industry puts a lot of work into. We're very engaged at the national level with various agencies, including FBI and Homeland Security and agencies within our industry to ensure that we stay in front of things. But it's an ongoing battle. And whether you're in the energy industry or the banking and finance industry or healthcare, anywhere today, it's a bit issue. Cyber security is a huge issue.

Tom:

Put a lot of work into it. We've got a really strong team that focuses on those kinds of activities, but it's not something that we can ever be satisfied and think, "Well, we're there. We don't have to worry about it." You always have to worry about it. The bad guys are always figuring out new ways to be bad. Answer your question? Okay.

Tom:

And then, so the next question, this gets into our discussion draft on SD5, and I want to talk, as sequestration came up as a question, and what we're doing in terms of carbon sequestration. So, I'll answer in the terms of this discussion draft that I'm going through.

Tom:

So, our board, they're elected by you to represent you and provide oversight and set policies for our organization. And they set policies through what they call strategic directives, and those strategic directives really set expectations of the management around important business activities. We have one related to our cost competitiveness, we have one related to reliability standards and meeting those standards. We have one related to safety, we have one related to how we serve our customers, how we interface publicly, those kinds of things.

Tom:

This strategic directive 05 that we're talking about, the discussion draft tonight, has to do with our generation resource mix and specifically as it relates to our carbon emissions goals. We have to, as you heard in the first presentations in the industry, we have to balance a lot of issues to ensure low-cost, affordable, reliable and resilient and sustainable power supply to our customers. There's lots of regulations we're subject to and lots of trade-offs to find the right balance of those things. We are regulated on the emissions on our power plants, for example, in several ways, and we've been regulated for decades. And that's part of our calculus, our thought process as we think what is the best resources to service us in the future is how do we meet those regulations in an affordable, reliable way?

Tom:

And so, the carbon discussion is just another piece of that discussion in terms of it impacts our ability to serve our customers. We have a very diverse customer mix. As mentioned, we have customers that are very interested in having a 100% renewable or a low carbon resource mix because of the markets they compete in. They compete when selling ethanol, they compete in selling carbon black in the case of one customer. In markets where their customers are looking for their products being made in sustainable and renewable ways. So a good example of one of our customers who is a customer of one of our large wholesale customers, they are interested in having 100% of their power supply come from renewable resources. So we're working right now with them and with our wholesale customer to figure out how to do that. But reliability and affordability continues to be part of that discussion.

Tom:

In terms of the ag sequestration, we're working right now on a pilot project with a large cooperative in Eastern Nebraska to document and understand how farming practices can help capture additional carbon in the soil. Carbons are great for raising crops, right? It's part of us. I mean, it's an important part of us. But if we can capture some of that in the soil and show that it's retained there, it potentially creates a better growing environment for those farmers, potentially creates a way for us to capture credits that help us show how we're reducing our carbon over time. And we've, in 2005, little over 29%, 2020, little over 45%. The big change there for us is we've added some wind and solar. We have hydro as part of our mix. We've worked with the community of Scottsbluff to put up a community solar project that's been well subscribed and very interested there. We're working with other communities in the state to do the same.

Tom:

But the big piece of it for us is really our nuclear power plant. The difference between 2005 and now is in 2005, large portions of the output of our nuclear power plant were sold to other utilities, so they weren't part of our mix at that time. Those contracts have expired. They're now part of our mix, and we're using that carbon-free [inaudible 01:26:27] to serve our customers. We're one of 21 entities in this country that have the technical competence and the staff and the license from the nuclear regulatory commission to operate safely and reliably a commercial nuclear power plant. So certainly, that's part of our advantage today, and that's something we're very interested in following the new things going on in nuclear technology, and how new nuclear technology can be part of that mix. And that mix, from our standpoint, diversity is really important. You saw where we were in-

PART 3 OF 5 ENDS [01:27:04]

Tom:

Complexity is really important. You saw where we were in 2005. You see where we are in 2020. And we have a diverse mix of resources. So how can we use those resources, maintain that diversity that gives us an ability to ensure reliability/resilience, build on affordability, and not put all of our eggs in one basket? Which is part of the Texas story.

Tom:

So I'm going to hit this quick and give you a chance to ask any questions. So, this is the discussion draft. It's four paragraphs. Again, this is not a final product. This is a product that the board has put out, and management has put out with the board, for discussion and feedback. The first paragraph is really about the preamble: us having to think about carbon as one of the issues, and both a business risk and an opportunity for us at NPPD. We are working on some pilot projects with the federal government, funded by the Department of Energy, looking at different aspects of how carbon capture and sequestration can be accomplished. And not only just for us, in our power plant, but potentially for some of the ethanol producers in the States, so that the carbon footprint related to their product becomes lower and allows their product to be more competitive in other marketplaces.

Tom:

So, the second paragraph's the goal. It's pretty simple and straightforward. Achieve net zero emissions from our resources by 2050. So, not have 100% carbon free, not have 100% renewable, but have a combination of diverse resources with the ability to capture credits through offsets and those kinds of things, to get to a net zero emission profile for our resource mix, while assuring affordability, reliability, resilience, and meeting those sustainability goals that we have. Whether it's for carbon emissions or other emissions that we need to think about and consider in our decision process.

Tom:

The third paragraph is how we measure. We measure today. Our board is responsible for providing oversight, ensuring that we're doing our jobs, ensuring that we're meeting the expectations of our customers. So, we do this already. But this is clearly a, "This is how you're going to report on our emissions." And we're going to report it in two different ways, which we do today. One is we refer to the carbon intensity, and you can think of it as the miles-per-gallon rating, or the fuel efficiency of your automobile. Carbon intensity is just the pounds of emission per megawatt hour of generation that we have. And the other metric is in terms of total tons emitted. Both of those are important as we look at how we move towards a lower carbon resource future, and how we look towards operating our units efficiently and effectively, because both of those metrics give us an impact on the kinds of things we can do or give us insight on the kinds of things we can do, to ensure reliable, affordable, efficient operation of our facilities.

Tom:

And then the last paragraph is what I call the off-ramps, our off-ramps. And as we saw in the feedback through the presentation, and we've seen in the other presentation, the idea of reliability is important. The idea of cost-competitiveness is important. As I mentioned, our board has established strategic directives for us, in those two factors, as well. There are expectations from policy guidance for us as a management team. So, all they're saying here is, if there's a point in the future where our meeting the carbon goal potentially impacts progress towards these other two goals, the board's going to step back and evaluate and take a look at it. And then, if they determine that one or more of the goals need to change based on that review, then that will be their decision to make.

Tom:

This is basically them saying, "We know these four areas, or these three areas, are really important." Four, because I put resiliency and reliability together, right? But reliability/resiliency, affordability, and sustainability are important. And they interact with each other. Finding the right balance is what we're trying to do here. And this is the board's commitment to say, "If things look out of balance, then we're going to step back and look at it." Four paragraphs. Fits on one page. Discussion draft. Hasn't been approved by the board yet. They're going to take the discussion, the feedback that's coming out of these sessions, to inform them as they finish their deliberations. It may look this when they're done. It may look like something different... That's it. Looking forward to your questions and comments. Any feedback you have. And guess what? I think there's a couple more polling questions.

Brad:

Shocker, yeah.

Tom:

Shocker.

Brad:

More polling questions.

Tom:

So.

Brad:

Yeah, let's do a couple quick polling questions, and then Tom will be more than available to answer your questions. So, we have three. So, the first one is this: in your opinion, is a net zero decarb goal by 2050 too ambitious, like before, or about, right? Not ambitious enough? Or no opinion on the matter? As Allen alluded, this is a pretty common goal in the industry. Not to say it's easy. It's a very ambitious... I don't want to bias the answers here. It's a tough task, but it's a pretty common goal across the industry. We have 23. Looks like that's a... So, too ambitious: slightly less than half. About right: about a quarter. And not ambitious enough... So again, kind of bimodal. Let's look at the next question.

Brad:

So, the goal presented is the 30-year aspirational goal, all the way to 2050. 29 years. How often do you think the goal should be formally reevaluated between the board and leadership? Looked at? Adjusted, perhaps? 1 to 5 years, 6 to 10 years, or 10-plus? Pretty sure I know the answer to this one. Pretty straightforward, I think. I'll probably surprise myself, and you'll come up with a different... Yeah. Everybody, in all settings. Of course. Why would you not be pretty on top of it, as a board and as a leadership team, to monitor this closely, and then make adjustments if and when appropriate?

Brad:

And one final question. So, of the information presented tonight, where do you feel you need some additional information? So, again, the risks of being a carbon utility, whether it's tax implications or others; the core utility principles, that trade-off on those key principles; a better understanding of NPPD's carbon reduction discussion draft; or, at this stage, you're good, you don't need any more information? So... about a third, a third, a third, on the final three. So, roughly a third don't need more information, and roughly two-thirds want to continue to understand the balance and trade-off between the core principles. I think that was generally the number-one selected item in the other settings. And also, just further understanding about the process and the logic and the thinking behind the current strategic discussion draft that Tom shared.

Brad:

So, with that, again, we're happy to hear your comments, in response to what you've heard. We're happy to address your questions. We have ample time. So, please, if you have any thoughts/questions for any of the experts up here, certainly for Tom and NPPD, please come up and let us know.

Tom:

And if you had questions in the first session that I didn't get answered, or you didn't understand, please ask them again, as well.

Brad:

Yes, sir.

### 3.4.2 Second Public Comments

Curtis:

Hi. I'm Curtis [Cayton 01:35:12], Power Suppliers Midwest Electric Co-op and the Grant. My question is, in the outcome of this process, carbon regulation, worldwide, let alone in the United States, is largely absent of law to guide goals, policies, that utilities, economy-wide sectors, are adopting. Or drafting. If at any time that law would come into this, is this plan nimble enough to react to law, and either redact or not invoke anything permanent enough that, should law mandate a change at some point in the future... Or just throw the thing out then, and comply to law? That's the question.

Tom:

So, from NPPD's perspective, there's certainly a regulatory risk that enters into this discussion and debate. And it's something that's been and continues to be addressed, both at state and federal levels, depending on where you are in the country, right? And if there is regulation, or when there is regulation established, we would be obligated to comply with whatever that says. I think that what we're putting in place and what we've been doing for many years, around the potential regulation of carbon emissions, is very similar to what we do around the real regulation of other emissions that we have. And we continually work with our regulators to adapt and adjust, whether it's emissions related to the Clean Air Act, emissions related to the Clean Water Act, what we do to comply with cybersecurity regulations, NRC regulations. So, from a flexibility standpoint, regulation, should it come to pass, or when it comes to pass, will change. We'll adapt to whatever that regulation drives us to. As we do today.

Curtis:

Yep. Would it... May I still have a follow-up question?

Tom:

Yeah. Please.

Curtis:

Okay, the air that we breathe, it's .004 of 1%. Carbon makes up .004 of 1% of the air we breathe. If we're considering offsets, would considering offsets, or buying offsets just add cost to the rate that we're paying for electricity, and the same ten million tons of CO2 that would come out of the stacks of [inaudible 01:37:51] station every year continue for every year after, but we're going to add cost by purchasing offsets to account for that CO2?

Tom:

In a regulated framework? Is that what you're suggesting?

Curtis:

Regulated or not. Regulated would be different, I'm assuming. But right now it's non-regulated, and we've got projections of, "CO2 may be worth this, or it may be worth that..." It's a guess, right now. Correct?

Tom:

So, I guess, ultimately, the decisions of the path we take, or the paths we take, are finding the balance between cost and reliability, and meeting our goals, and resilience. Right? Reliability and resilience are the same thing.

Curtis:

Reliability. Yeah.

Tom:

Right. Reliability's close enough. So, it's something that we have to put into the equation and balance, "What's the best way to get there?" And certainly, the affordability piece of it's a very important part of it. So, it's not necessarily a one-or-the-other. It's not a mutually exclusive trade-off. It's looking at the complexities and the factors and evaluating them in a way that arrives at the best answer, as you try and find the right balance between those three very important factors.

Curtis:

Yeah. I would hope that law would govern the price that would be... Or the cost associated with the cost of offsets. Rather than a volunteer structure of some kind.

Tom:

Yeah, so, and I think that's a great-

Curtis:

I'm done.

Tom:

Yeah, no, that's fine. I think that's a great question. It's worth a comment. And the EPRI folks and Brad might have some ideas. There are parts of the country that do have frameworks where they've established costs for carbon emissions, right? And there's different ways of doing that, and that'll be one of the big debates that will have to happen if there's ever a national framework. But certainly, at some point, if that were to happen, there will be some sort of mechanism that establishes a value for that emission to drive the incentives to accomplish the goal of whatever the purpose of that rule or regulation was. That will impact the marketplace we compete in. It'll impact the risk and opportunities for our units. And that'll be an important part of the assessment process. So, in simple terms, if there's regulation, the regulation hopefully is designed to provide the right incentives to meet the goals of the regulations, and we can all probably spend hours talking about where that didn't work right. But if it does work right, that's the purpose: to provide the incentives to get the industry, the regulated utilities, whatever, to move in the direction that those incentives are rewarding.

Brad:

I would just-

Tom:

And we would respond that way.

Brad:

I would just add this: I think, somewhat, behind your question, that you'd rather decisions like this be driven by regulations or law vs. voluntary, I think. And I think the likelihood of regulation or law, probably regulation before law, nationwide, is... This is my personal... is very likely. If you just look at the momentum behind this topic, just a few years ago, you just saw a few coastal cities or states addressing this, and now it's just sweeping across much of the country. Many states, many companies, both utilities and non-utilities, around the world. So, I think the wave of momentum is, right now, overwhelming. So, I think the possibility of regulation that will dictate, ultimately, what these decisions need to be is not unlikely. In the next 5, 10, 15... Of course, it's sensitive to administration and other issues, but... So, I think the fact that we've... My personal view is that you have a... Your embarking, potentially, on an involuntary approach will ultimately lend itself nicely to having to give that some real strategic thought, if regulation does come down the pike... Please.

Dustin Rief:

Hi, Tom. Dustin Rief, City Manager of Scottsbluff. I have four questions, and I'll start with the first one, and relate it to the draft you just presented. And so, is there a thought process on establishing a baseline of where the state is overall on carbon emissions, so we're using new resources of carbon capture, and not just traditional farming practices, but in that process of, "Okay, well, there's a new technology. Let's utilize that." Because, you know, worldwide, we're at a status where we keep increasing. And if we're doing the

same practices over and over, they're not actually doing the right thing. So, is there a thought process related to that, in the scheme of that, in that process of... In the draft, of where it's like, "Do you look for new, upcoming technologies?"

Dustin Rief:

I'll kind of tie my second question into that, just from a conversation I had with Black Hills Energy here just a couple weeks ago, about bio-methane and bio-producing gases, and their perspective on the same stuff with carbon capture and offsets and stuff. Is there a thought process of looking at methane as a production source, from maybe the cattle industry? They were primarily interested in hog and dairy, just because they could sell it out-of-state and produce more money. But here, in-state, we're beef country. I mean, we are what we are. We produce a lot of beef in the state. And so, is there a thought process of maybe looking at some of those projects that come from Northeast Nebraska and Cuming County, with 400,000 heads of cattle? And one of the biggest issues they have is land management and applying the waste. And if there was a way to capture some of that methane, and other types of things; there's impacts to the water, and there's impacts to the air, and all that kind of stuff. So, kind of, I'll let you... If you go with those two questions first-

Tom Kent:

Go with the two questions. Okay. So, first off, the baseline, it's fairly typical in the United States, and the regulatory frameworks that have been established use 2005, generally, for a baseline. That's what we're doing, so that's the starting point that we measure our future against. So, in regard to new technology related to that, yeah, new technology's a big part of the discussion, and a big part of our research. Both what we do individually... we have a small group that is focused on new generation technologies. They spend a lot of time looking at hydrogen and hydrogen compounds like methanol, related to ethanol; methane. We are investing some significant effort in looking at things like capturing methane from egg production. It's easier to do with hog confinements and chicken confinements than it is in cattle operations, but there's still opportunities there, and we are working with some major producers on those kinds of issues, to see where there's opportunities.

Tom Kent:

Quite a few years ago, now, one of our customers, one of their board members, in fact, was a pilot for a methane capture facility in the Cuming County, Nebraska area, years ago. We're doing a lot of work around nuclear, I told you, and also, we... And as I mentioned it earlier, we're working quite a bit with some DOE grant monies to look at carbon capture sequestration, putting carbon dioxide in pipelines, using it for other value-added products. Not only for our benefit, in terms of lowering our carbon emission profile, potentially; but also, it could help the ethanol industry in the state quite a bit. Because they work to make their products competitive in markets like in California, for example. That answer your questions?

Dustin Rief:

I think so. I hope so.

Tom Kent:

So far, so good?

Dustin Rief:

And-

Tom Kent:

Oh. One more plug for EPRI.

Dustin Rief:

Yep. Go ahead?

Tom Kent:

We've been an EPRI member for a long time. They mentioned the low-carbon research initiative. We're heavily engaged in that. So that covers the broad spectrum of a lot of technology discussion, and how you integrate these complex systems, not just in our sector, but economy-wide. So, a big part of the discussion is, we looked at the future, and a big opportunity for growth for the electric/utilities sector is the electrification of other sectors. And how do you do that in a way that accomplishes some of these goals? And EPRI's pretty engaged in that.

Dustin Rief:

That kind of ties into my next two questions, or next question, at least. Now, as Ford has now come out with the new Lightning F150, and wishing it would be more accessible for charging hubs and those kinds of things. I mean, being here in the panhandle, we're a long ways from a lot of places. And so it was a, "What is NPPD's role in trying to improve that network?" As a lot of these automakers are starting to set 2025/2035 goals of being 100% electrified, and how that's going to impact the network, and kind of what is the NPPD's role in growing that?

Tom Kent:

That's a great question. Our board, two years ago, authorized adding its two-million-dollar line item to our sustainability group, and it's focused on electrification efforts. And the COVID year was a tough year; there wasn't a whole lot going on in the economy. But this year, we're spending a lot of time and effort with our wholesale customers and our retail communities, doing things like partnering with them and some of the businesses in the communities to install charging stations. So that's part of what we're trying to support through that process: partnering through the local utilities, partnering through the retail communities, to do those things.

Dustin Rief:

Okay. Great. And the last question: solar incentives on residential. Is that something that's a part of the mix of what you're looking at? Out here in Western Nebraska, we have 300 days of sunshine a year, and not a lot of rain. So, it might be a little bit more productive out here than on the Eastern side. But, just, is that something that's in the mix of what you're looking at?

Tom Kent:

Today, our incentives and our discussion around solar have really been around community solar. And there is some economies of scale, as we know here in Scottsbluff. We were able to subscribe that, and give individual residential customers the opportunity to participate in that. And not necessarily have the issues that might come with doing it on their own house, right? Is their house oriented right? Do they have trees around their house? Do they want to put it on their roof? Is their roof the right pitch? So we've been focused more on community solar. At this point, anyway, rather than individual solar incentives. But it doesn't mean that that couldn't change over time, as we get feedback from our customers and the public.

Dustin Rief:

Okay. Thank you.

Brad:

Thank you. Yes, sir?

Roger W.:

Roger [Wess 01:49:37], of [inaudible 01:49:38] Nebraska. And we are an NPPD customer. And one of the things I've been doing for a lot of years now is, I have a rather large solar array at my home. I have a battery, electric car, geothermal energy. I have a zero-turn riding lawnmower. Electric. Anyway, I'm very much on board with going to a carbon free economy, and the reason for that is that, if you look back to a statement that was made many, many years ago, and many, many times, one by Adlai Stevenson, is that we live on a spaceship Earth, and we have to take care of it; we can't get off of it.

Roger W.:

And my main question is that, as we take a look now at the changes that are happening... and they are happening lightning-fast, as you said... how well are you prepared to provide all of the extra energy that's going to be needed now? And I think you answered some of that just previously. In the next few years, as we go to electric cars, it looks to me like we're going to go to electric or hydrogen-based iron and steel manufacturing, and all kinds of other things. And this is going to put tremendous pressure on supplying EV connections; it's going to be a tremendous amount of pressure on putting in a very flexible transmission system. And how is all of this going to fit together? I'm really concerned how we're going to get carbon free. Much more energy to keep us going.

Tom:

Well, I wish... You asked the million-dollar question, or the billion-dollar question. This is where it all comes together, as we look to the future and look at all of these trends. And at the end of the day, that's where we work with our customers, our utilities we serve, the end-use customers we serve, to find the path forward that's best for us in Nebraska. That may be different than the path it's taking in other states. That's why we work with organizations like EPRI, to help us prepare for and ask the right questions and have them help us solve some of these problems, to ensure that that reliable electricity supply is there, as we see further electrification in other sectors.

Tom:

And we will see further electrification in other sectors. Electricity is the... Fundamentally, it's the easiest way and most reliable way to transfer and use energy that man's come up with today. Right? And it's not the source of energy by itself, but it's the way that makes energy easily usable. That fuels our life. It fuels the quality of life, it fuels our economy, and it fuels business. And so that's the dynamic, that we work with entities like EPRI to solve those kinds of challenging problems. Now I'll turn it over to the experts.

Roger W.:

Yeah.

Tom:

Because they may have the silver bullet.

Brad:

Let me just add a footnote. Let me just pick on the EV one, which is really an important item to recognize, and I think that, sometimes, we forget this. An electric engine, as in an EV-powered vehicle, is much more efficient than a gasoline engine. So, you can actually go to an electric utility that's 100% coal-based, and an EV will actually create savings on carbon. Which says that as you begin to clean the electric supply, our gains are really significant. So. And when we look at our total energy use in the country, transportation is of the order of a third of what we use. And so, things that impact transportation, that we can actually address electrically... And that ease of use, Tom. Your point there is really a good... Electricity is one of our forms. Of getting energy in that form, it becomes so much more useful.

Roger W.:

I agree with that. And then the other thing that I would pursue, I'm going to push this issue a bit: I addressed the board in Kearney several years ago, when you were doing your five-year plan. And I sort of challenged you at that time, "What are you going to do for long-term storage in your next plan, now?" And I mean by really long-term storage. You're going to have capacitors, you're going to have batteries, but you're going to need long-term storage if we're going to talk about it in hours and days. My favorite is liquid air. But anyway, what kinds of things are we looking at in the next plan that we're doing?

Tom:

I can tell that whoever solves the long-term storage challenge economically, that makes it really easy to do for electricity, is going to become a very rich person. Because that's the game-changer. Batteries, that's the focus today; batteries provide storage. It's more of a short-term storage capability. It has a lot of benefits. Pumped hydro facilities, which is basically having two ponds that are at different elevations, and you can store the energy in the form of that potential energy difference, so you pump it uphill, and you run it back down through a generator. That's around, but that has limits, because of either environmental concerns or just finding the right geography.

Tom:

We looked hard at that 20, 30 years ago. It's still something we think about. We actually, a couple years ago, not liquid air, but we were looking at compressed air storage, in a geologic sandstone formation. And so those kinds of things have opportunity. It's, "Well, do the economics work? And do the physics work?" Some of the studies, like with the geologic storage of air in sandstone formations, there's been some work done, and the geology's got to be really good. So there's a lot of risk-

PART 4 OF 5 ENDS [01:56:04]

Tom:

... been some work done and the geology's got to be really good. So there's a lot of risk around doing all the drilling and figuring out whether the geology really works. There's been some studies that's like well, we did the drilling, checked the geology and found out it didn't really work for us. So there's all that kind of stuff.

Tom:

On the horizon, as you look at some of the new technologies, things like using liquid salts to store energy in the form of heat for long periods of time, and then it can be used in ways to create hydrogen economically. It can be used in ways to extract and run a generator later. That's a scenario that's getting a lot of focus right now as well. So there's different things being looked at. The challenge still is getting it at scale economically. That's the challenge. When that gets solved, someday it will, whoever has that patent will be a happy person.

Speaker 5:

I guess that's why I like liquid air because that's a technology that's pretty mature. The other thing I'd like to have you respond to is how are we working with your REA partners and so on as far as getting them involved with supporting distributed electrical energy production? And supporting them, getting them to support energy for irrigation, for livestock confinements and so on? In other words, how can we strengthen this partnership so that this becomes a very strong part of this whole process?

Tom:

Well, for us that's a critical aspect of it. Half of our businesses through the partnerships we have we with our wholesale customers, a quarter of our business is through the partnerships we have with our retail

communities. And so, we spend a lot of focus and effort working with them to help them solve their problems in terms of efficient electrification for an irrigation company and how they deal with efficient use in different Ag uses, whether it's hog confinements or chicken farms or beef or whatever.

Tom:

We spend a lot of time and effort working with them. We've got different programs related to some of these things I talked about tonight like the battery, or not the battery, the charging stations, energy efficiency programs that we've developed in partnership with our customers over the years. And we adjust those based on their feedback. And they're in different places. They serve a diverse customer base themselves, right? So, the view might look a little different for one of our customers in southeast Nebraska than it does for one of our customers in northwest Nebraska.

Speaker 5:

The reason I bring that up is that I'm 81 years old and I can recall being on a farm in Iowa when the REAs were coming through. And that was a tremendous boom, especially for the women on the farms. I can recall as a kid having to haul water in from the cistern for this, that and the other thing, heating it on the stove in the reservoir. Some of the older people here probably remember some of that stuff. That was tremendous, and to me the REA is another vast channel to making life so much better for our Ag people. And really, we need to push that issue.

Tom:

I totally agree. And it's a partnership. We do a piece of it. They do a piece of it. But we serve the people of Nebraska together. We work together to accomplish that and that partnership. And they are critical to the quality of life that rural Nebraskans have today, most definitely.

Speaker 5:

Okay, thank you.

Speaker 6:

Thank you, sir. Other questions? Other comments for the board and for Tom? Yes sir?

Steve Welch:

Hi, I'm Steve Welch from [Chadron 02:00:14]. And I've got a question on, well I guess at first a comment. So, I know on a number of your slides you've talked about reliability, resiliency, sustainability, affordability. Did I get them all?

Tom:

That's it.

Speaker 6:

You got it.

Steve Welch:

And you talked about how it's a balancing act between one and another. But I think if you back out a little bit and look at cost to society, not just cost to the customer, I mean, in the end it is the cost to the customer. Climate change is a cost to society, right? And so, if you put the cost that fossil fuels have to society, if you include that in the equation, it's going to change your dynamics between those variables, those four variables, so that cost... I mean, if fossil fuels were actually priced at what their real cost to society is, there might be a decrease in cost and an increase in reliability, resiliency and sustainability as you switch from fossil fuels to cleaner energy, right?

Steve Welch:

I mean, we need to look at the big picture. It's not just narrowly focused on... I mean, I know you have to focus on NPPD being solvent. But somehow, we need to back out and look at what it really costs all of us. So, I'm a member of Citizen's Climate Lobby, and our only focus, we don't really talk about technology. We talk about what's causing the problem. And it's carbon. So, we need a price on carbon. So, I'd like, I guess, to hear about what you think about that. Right now, we are in a situation where historically conservatives have said that climate change isn't happening. I think they're changing their tune a little bit now it seems. And then democrats or liberals, progressives, whatever you want to call them, have said oh, we need to do something about climate change.

Steve Welch:

Well, the way the situation looks right now, we've got in the works some big climate plan that is not talking at all about putting a price on carbon. They were talking about just using straight regulation, I think basically setting quotas for how much energy must be clean that you'll have to follow. What would you rather have? Would you rather have a system where the actual cost to society is reflected in the price of the commodity so that consumers can have a price signal that they can actually act on, rather than have it displaced somewhere else?

Steve Welch:

I guess we need some help. So, I'd like to hear NPPD say yeah, let's put the price where it belongs, put the cost where it belongs so consumers can make those decisions.

Tom:

So certainly, putting a price on carbon is one way to regulate it, right? And it would have outcomes that if done properly would hopefully incent the right, whatever was trying to be incented, right? Reduce carbon emissions. Let's assume that. We have other emissions that work in that kind of world today. We do cap and trade with sulfur emissions under the Clean Air Act. We do some stuff under some of the other acts, some of the other emissions regulatory frameworks that we have.

Tom:

The challenge is there's sometimes unintended consequences, right? So, if you're going to do that, how does that impact the economy? How does that impact people that might be in a disadvantaged situation from where they live, their income, those kinds of things. And so, setting a price filters down in the economy and then impacts the people that pay for that product with any type of regulation.

Tom:

Those kinds of things have to be thought about and thought through in order to land at the is this the right mechanism to use? So, I'm not here or there. I just think the issue is more complex because once you introduce that cost into the economy, it's going to impact people. And so how do you address that in a way that's fair and equitable and accomplishes the goals?

Tom:

Do I think there's going to be regulations someday? You bet. Could that regulation likely include some sort of cap on trade market or some sort of established price for carbon? Sure. Is it set up in a way that effectively manages the unintended consequences of doing that is the big challenge.

Speaker 7:

I mean, capping trade, you probably know better than me. But we're near legislation on cap and trade, I guess now time flies, 10 or 12 or 15 years ago. And then we have a Reg E market in the northeast. So, you have some cap on trade and it really hasn't done much and hadn't influenced much I don't think. So, I think the carbon tax is a more likely outcome, which I do think would send the right signal. And the view has always been for some of those unintended consequences that some of that money raised through the carbon tax would be applied to underserved communities in some of those areas.

Speaker 7:

So, I'm frankly personally surprised that the carbon tax hasn't gotten a little bit more attention over the last few years. Of course, the previous administration I'm not surprised. But with the current one, I think you're right. It's more about quotas and executive orders and targets and those sorts of things versus a lot of chatter on carbon tax.

Speaker 7:

So, I'm like Tom. I think that it's going to happen one day. I don't know when. I'm surprised it's not getting the attention today that, or if it is, it's not well known. Tom?

Tom:

Let me just add a thought and maybe even ask a question in the following sense. Is that if it was easy to determine what that cost impact is, just for a lot of the reasons that have just been articulated, it is

extremely complex to come up with that and usually what we do is we try to establish a metric whereby we can actually compare things. And probably, actually determining what that cost may be, that is extraordinarily difficult.

Tom:

I think what we try to do as a proxy, we try to do through regulation to try to take some first steps in that direction. That's what regulatory processes do. They don't get it exactly right, but they usually start moving us in a direction. And in time, that evolves. So, I think that's one of the, that's probably the most difficult. How do you actually arrive at what that cost is?

Steve Welch:

Thank you for that, Tom. Just, I mean, you did put up some slides. I can't remember who presented them, but there was a price on carbon, an estimated cost, upwards of, I think it was around \$30 a ton now and up above, I mean, I've heard of vestments of multiple times of that, right? And I think your highest number was maybe \$80 or \$100 a ton. So, I mean, I guess A, we do know that it does have a cost-

Tom:

There's no doubt about whether it has cost because they're mostly proxies.

Steve Welch:

Right. And I think that establishing a fee on carbon, I like to call it a fee myself because I strongly support an idea of carbon fee in dividend where the money is actually returned to consumers to protect the lowest income people in the country, and the people that can afford it, they can afford to pay. So, start it low and you can use it like a reset. If it's not doing its job, you turn it up. So, every year it goes up a little bit but you start out with something that comes to the equivalent of 10 cents a gallon, adding 10 cents a gallon to your tank of gas, I mean, that's not a big shock to the system and it can be dialed in. So, I understand that we can't, we don't, we have a hard time establishing the price, but we know that it does have a cost [crosstalk 02:09:54].

Tom:

Let me just add one other number that I injected in last night's discussion that is of interest. So first of all, the impact of carbon is global, not just the US. And the effects that we're having are global effects. There are about 36 gigatons of carbon put into the world's atmosphere on an annual basis. The US contributes about five to five and a half of those gigatons. So, the balance of that comes the rest of the world. That other roughly 30 gigatons, and albeit, this is where the notion of what's it worth gets really complicated, because things that would impact overall are way out of our ability to control.

Tom:

It doesn't mean we shouldn't do good things. And I think what I've tried to say previously is that the intellect that we have in this country can show the way about how we can, well, how the world can actually have processes to address how to reduce carbon.

Speaker 6:

Thank you for your comments, Steve. Any others?

Daniel Bowen:

Hi. I'm [inaudible 02:11:26]. Can you guys hear me?

Speaker 6:

Yeah.

Daniel Bowen:

Okay. I'm Daniel, Daniel Bowen, and I come from Chadron and a proud NPPD customer. I just wanted to say, just begin to say really, I thank you for coming out here and actually also coming out here with the slides and everything and places to take notes. It really looks like you're taking this seriously. There have been a lot of cases where it just seems like people come out and it's just a PR exercise. I really appreciate you taking that seriously. So, I want to just say thank you guys because I know that's kind of tough to come out here.

Daniel Bowen:

One thing I noticed is that there are a couple of places that it occurs to me that we might actually be able to do something that I think everybody would agree on in terms of the emphases of environmental things and then things like cost control and reliability. One of them, when we were driving up here, we saw some wildfires, seeing them burning next to the highway. That's something that in a lot of parts of the country is connected to the power generation grid in a sense that the wind comes along, blows over a line and then you have a fire.

Daniel Bowen:

If you actually can come up with ways to make sure that that's reliable, that would be really important, it occurs to me, that trying to control risk. That's also important because if you look at what's happening in California right now, there's the legal aspect where it's like they feel like they have to shut down. And so, we're not going to have a very reliable system if we aren't able to control what happens when the wind blows. In Nebraska, we literally, they used to call it Nebraska's effort. It was something special. It's like that seems to be something that you should really pay attention to. And I think that's something that would be worth calling attention to because that's environmentally responsible as well.

Daniel Bowen:

When we're talking about climate change and all the rest, that's something that is definitely a part of that process. And if you can actually do that, that's going to be something that everybody should appreciate. So that's an example of something.

Daniel Bowen:

One other thing that I think that is going to be important, I think for people who are either consumers and are concerned about price, or people are concerned about the environment, is do you have a process that is, that seems to have a good way of measuring and looking at all of the options and setting goals in a way that basically... for example, if you had a purchase guarantee, if you had a sense of if you can cut, you can reach this price point, we'll buy it, that's something that would be one way of addressing the question of what kind of works on the price. Because you have a situation where people are afraid of very large prices, and at the same time that no, nothing's being done from an environmental standpoint. If you can come up with some way to try and provide an incentive or some kind of clear benchmarking, that would be, I think, useful potentially for NPPD because it's a public institution. It's tricky to try and manage those things. If you have a way of setting those standards, that would be good.

Daniel Bowen:

If that seems like a little bit of a reach, if you could have even some way of funding research that would, just even on a reasonably small scale, for students in our universities, that would be something that I think everybody would appreciate in the sense that there would be some way of actually getting an idea of what systems are beneficial for Nebraska. And then having people who are actually, young people in a position to actually implement those systems and so on and so forth. I think it's going to be very, it can be kind of difficult for guys, you've got a lot of things on your plate, to just focus on that and do it all inside. And if you can actually send a little bit of funds out to college students or through scholarships or something like that to do that research, then that might be something that I think people could agree on more widely.

Daniel Bowen:

Anyway, again, I'd like to say thanks for coming out here. I appreciate you making that effort.

Tom:

Thank you for your comments. And I just want to address a couple of those because I think those are all great ideas. And one of them is a great idea because we're kind of doing it and Director Harding and Director Kennedy and I were at a meeting today with a Nebraska Center of Energy Science's Research, which is center that we funded at the University of Nebraska to do those kinds of things. So, there's certainly more opportunity to do that kind of stuff. But you're right on target in terms of the need to work with our students and our colleges to help them become ready for the work force and work in our industry. We do that with the community colleges around the state, including Western. But then Nebraska Center is kind of focused on some of that future stuff. And certainly, our funding as a member of [EPRY 02:16:39] focuses on a lot of the areas specifically to the areas that EPRY focuses on.

Tom:

Kind of the benchmark, the standard, we mentioned it at the very beginning. When I heard you describing what you were thinking would be good, and I agree with, that's our integrated resource planning process where we go through a very robust analytical process looking at all these issues and all these options, looking at costs, all those kinds of things you talked about to set that 20 year look into the future in terms of that path for us to go down. And we'll be kicking off our next integrated resource planning process as kind of the next step after this discussion. And that'll start this fall.

Tom:

And over the next couple years, you'll see a lot more information, and we'll probably at some point have another group of these sessions around the state where we're talking about where we are in that process as well and getting feedback. Because public feedback is an important part of that process as well.

Daniel Bowen:

Thank you.

Speaker 6:

Yeah, thank you for your comments, sir.

Daniel Bowen:

I was just going to say too, in terms of setting goals, one thing that occurs to me, you could actually do that for customers as well. For example, if you were to say Nebraska should be able to meet any multinational company's goals for power, we should be able to actually, if they want to order something, maybe it's a little bit more expensive, then they should be able to come here. I think that's something that would certainly be business friendly, on one hand, but it also would be important in terms of helping to get environmental innovators here. So that would be something that I think would be beneficial and good in that regard.

Daniel Bowen:

One other thing too is I don't think you're going to find a lot of complaints in terms of people being able to implement little independent micro grids, things like that. That's something that seems very much in keeping with the spirit of public power in Nebraska. And that's something that a lot of other places have not implemented to the fullest degree. That would be something that if you can create a structure that would make that available, that would support the values, conservative values, of independents, but also at the same time, you could help to get some relatively innovative stuff going here in the state.

Daniel Bowen:

Thank you very much.

Speaker 7:

Good ideas.

Speaker 6:

All right, anybody else? We will not extend the evening unnecessarily, but if any more questions, any more comments, please, we welcome them. Otherwise, we'll get, sorry?

Tom:

I forgot last night.

Speaker 6:

Yeah, the survey, we do encourage you to take the survey. I'm told we already have in excess of 1,000 folks that have taken it. I think the response has been terrific. Again, that's wonderful input into this process. Yes sir?

Michael Peterson:

I'm Michael Peterson. I have been watching coal trains for a long time. And it's scary. They seem, I encountered one today that had 140 cars on it. I used to have pretty good information on the density and frequency of the coal frame traffic going east full, coming back empty. And somebody's making a lot of money. Some will say it's better to keep the coal in the holes. And the oil in the soil. So that's my thought.

Speaker 6:

Thank you. I saw some coal trains coming in here as well. I was struck by the length of them.

Speaker 8:

I was already on the record, so I don't think you need my name again. But I just wanted to voice my support for what Daniel had said about distributed power as being probably something that I think would work well in Nebraska, particularly with all our farmland. If you have a way of putting some strength behind allowing people to have rooftop solar, particularly places where we have large rooftops like churches or places where people have large farmland where they could do land based solar. Putting some money behind that might be a way to then have distribution coming into the grid as well as distribution going out to the grid. It might be a good source of money for some farmers as well as a good source of energy for NPPD.

Speaker 8:

I understand some of the concerns with safety and security, with that and reliability. But I think it might be a good way to actually add to your power distribution system.

Speaker 6:

Yes ma'am. Thank you. I think the distributed energy resources are absolutely on the rise, nationwide certainly. And it sounds like Nebraska is an ideal location as well. But it's a huge opportunity. So Tom, I'll let you bring us to a close.

Tom:

Well, thank you for coming. A lot of great questions and comments. Appreciate all the feedback. Again, this is the fourth of five meetings and we've had good responses at every one of them. And I encourage you, if you haven't, go to out to [www.nppd.com](http://www.nppd.com) and fill out the survey. Most of you in this room that have identified yourselves as retail customers of NPPD, so that's the best way to find it. If you happen to be a customer of one of our wholesale customers, they might also have it linked on their website as well.

Tom:

So have a good evening. Thanks for spending your evening with us. Take care everybody.

Speaker 7:

Thank you everybody.

Speaker 7:

(silence)

PART 5 OF 5 ENDS [02:24:38]

### 3.5 Kearney

Timothy Arlt:

Okay. We're going to go ahead and get started. Please, quiet down. Come on into the room and take a seat. Okay, thank you all and good evening. On behalf of NPPD's Board of Directors, management and staff, we welcome you. We certainly appreciate you taking time out of your busy schedules to spend three hours with us to attend this meeting and provide us valuable public feedback, so thank you. My name is Tim Arlt, I'm the vice president of Corporate Strategy and Innovation at Nebraska Public Power District. I'll go over a few housekeeping items before we get going here. If we do hear the fire alarms, we're to exit the building, you can exit outside over here or through the front. If we happen to have a tornado and we hear tornado sirens go off, highly unlikely, but you could go to the restrooms, which are again, down the hall or over here are two state rooms, A and B, okay? If we have a medical emergency, we'll have Jen dial 911 for us to get help on the way.

Timothy Arlt:

So, some quick facts about NPPD. NPPD is Nebraska's largest generation and transmission utility. We are also a political subdivision of the state of Nebraska. We have \$1.2 billion of operating revenues a given

year. We own and operate 31 generation facilities providing 3,600 megawatts of diverse generation. So, for some scale, the community of Kearney which we sit in today, peaks at about 100 megawatts and we own and operate 3,600 megawatts of diverse generation. We also own and operate over 7,800 miles of lines serving all, or parts of 86 of the 93 counties in the state. We provide power at both wholesale and retail to 403 of Nebraska's 530 communities. We work in partnership with local utilities to serve more than 6,000 Nebraskans. We're governed locally by an 11 member-elected board of directors. Our mission is to safely generate and deliver reliable, low cost, sustainable energy and related services while providing outstanding customer service.

Timothy Arlt:

Based on our 2022 projections and proposed rate schedules, wholesale customers will experience no increase in their base rates for the fifth consecutive year, and our retail communities for the ninth consecutive year. Public power in Nebraska provides rates that are competitive and low nationally. Nebraska's residential rate was ranked eighth lowest in the nation, according to the latest Energy Information Administration data. NPPD's residential rates are below the state average. NPPD strives to power our local economies and find innovative practical solutions to environmental, social and community needs. We are not-for-profit, controlled locally and focused on our customers. We would not exist without our customers. So why are we here tonight? The reason or the purpose of the meeting is to start the conversation and get input from the public on the value of public power in Nebraska, NPPD's current and future generation mix and the state of decarbonization as we prepare our next integrated resource plan, which will be completed in the spring of 2023.

Timothy Arlt:

NPPD's board continues to move forward with the development of a sustainable carbon emissions' reduction, strategic directive that will include carbon reduction goals for the district. NPPD is committed to seeking customer feedback as a not-for-profit public entity of the state, which is governed by local constituents. We aim to operate in a transparent and open communication form. This is the fifth of five forums we have conducted around the state to gather feedback from customers. So, the conversation tonight will be specifically centered around the risk of being a carbon amending utility. How NPPD's carbon reduction goals should be structured. What principles, reliability, resiliency, affordability, environmental impact are most important to maintain as NPPD works to reduce its carbon emissions.

Timothy Arlt:

The goals and expectations for tonight, these are complex issues. Our goal is to give you a good general understanding of them, so you can provide us informed, valuable feedback. We ask that you hold questions till after the presentations to ensure we get through the material. Please, take what you learned tonight and apply it to this effort and initiative by completing a survey found on [nppd.com](http://nppd.com), or at our wholesale customer's websites who are promoting survey. Speakers tonight from the Electric Power Research Institute will provide a background on the topics of discussion, the slides will also be available on [nppd.com](http://nppd.com). Live polling will be conducted throughout the night to gather collective feedback. NPPD President and CEO Tom Kent will speak on the discussion draft of the carbon emissions' goal. There will be plenty of time throughout for your feedback, comments, and questions. We are recording this meeting

to capture all of your questions and comments for analysis. Brad Kitchens will be tonight's moderator. Brad is the CEO of Scott Madden.

Timothy Arlt:

He has over 30 years experience as an energy management consultant. We have some ground rules to provide comments. We ask that you come to a microphone, provide your name, city or state you reside in, who your electric power provider is, and any affiliations you may have. Comments should be concise. Our moderator may limit time if necessary to ensure all who want to speak, have an opportunity to speak. Please stay on topic. This is not a debate on climate science nor on NPPD's past or present performance. Comments should be civil. Please respect the opinions of others and refrain from debating one another. We do have five board members in the audience tonight. I'd like to introduce them. We have Melissa Freeland, Bill Hoyt, Wayne Williams, Gary Thompson and Ed Schrock. We also have the mayor of Kearney, Stan Clouse, with us tonight. We have Senator Lowe with us tonight. At this time, I would invite Melissa Freeland from subdivision three to provide a welcome from the board.

Melissa Freeland:

All right, good evening. To echo Mr. Arlt, I just want to say a, thank you for taking your time to come and join us this evening. As an NPPD board member of subdivision three, which covers this community as well as our neighboring areas. I'm honored to serve you, your families, your friends and neighbors. My hope is in listening and gaining an accurate understanding of your needs, and of your expectations. We can ensure that those are at the top of mind with any decisions, we as a board, make. This process works best when we can facilitate productive opportunities for you to communicate, which allows us to listen. Your feedback is extremely important to us, we welcome your discussion, your questions, and your honesty tonight. On behalf of the board and myself, we look forward to tonight's conversation, to tonight's learning. So, thank you again and welcome. We hope that tonight is a wonderful opportunity for you all.

Timothy Arlt:

Thank you, Melissa, with that, I'm going to turn it over to Brad to begin the presentation.

Brad:

Terrific, Tim, thank you. Well, good evening. Let me also offer my welcome to everybody here. What a terrific turn out. This is exactly what the board and the leadership at NPPD has been hoping for, for all the sessions. So, as Tim said, "this is five and five." So, if you're not aware, we went to Norfolk and Seward last week, we went to North Platte, and Scottsbluff thus far this week. Then we conclude with this session today. All of the sessions have been, maybe not quite this packed, but have been very well attended. The feedback, the input, and the participation has really been outstanding. So, we're eager for the same tonight. One thing Tim mentioned, which is important, this process is about informing the IRP process at NPPD. IRP stands for the Integrated Resource Plan. That is code for really thinking through as a board and a leadership team, what the future generation portfolio for NPPD should be in the coming 5, 10, 20, 25 years.

Brad:

It's a robust process of analysis of really thinking through the pros and cons of different technologies, the development and advancement of technologies, but equally important, is the input from you as customers and neighbors within the NPPD system. So, I really do encourage you to participate actively tonight. You have two bites at the apple, at a minimum. One, is input today. As Tim said, the other one is, "To participate in the survey that's available on the website at NPPD and some of the wholesale customers." I took it a couple of weeks ago, and I'll tell you one, it's easy, it takes about 10 minutes tops.

Brad:

Two, after each of the questions it provides some information about the question. So, if the question is around carbon CO2 trends around the world, that asks the question, then it provides some information on that. If asked about what other utilities are doing, it asks you a question and then provides some information on that. So, it's a terrific learning experience, as well as a survey. I'm told that just after it was posted last Tuesday or Wednesday, our first session at Norfolk, and we already have over a thousand responses. So, we're eager to have an equal number of additional responses in the coming couple of weeks. So please participate in that.

Brad:

Tim mentioned, we're going to do several polls tonight. So, this is going to be the one challenging session is to get you all online so that you can participate in these polls. There are two ways to do it. If you picked up this blue sheet, the instructions are on this blue sheet, but let me walk you through it. The preferred way to do the polling is to get on the website pollev.com. So, if you just Google Pollev, then just click on that, that'll take you to the website. It'll ask you for a username. So, you just put it in NPPD 999. It will then ask for your name. You can just hit skip, and you're in. Just leave that open throughout the next two or three hours, and you'll be able to do participate and engage in the polling. So, we really want to hear your feedback, so I'd encourage you to do that.

Brad:

The other option is through text. It's not quite as robust, and there'll be a couple of questions you won't be able to participate in, but nonetheless, if you prefer to text, the number is 22333, and then you'll just insert it where you would normally write your text message, NPPD 999, and once again, you're in. Okay. So, with that, let's do a quick test and see how many... I'm guessing we have 120. By the way, I think the NPPD folks have heard this enough at this stage, but this is for customers and guests only. So, no NPPD folks please participate in today's polling. So, the first question is this, "Of the topics presented, what's the topic that you're most interested to hear about this evening?" Now, "A, risk associated with being a carbon emitting utility. B, a better understanding of what NPPD's carbon reduction goals should be. Or, C. An understanding are the trade-offs and the issues as they relate to costs, reliability, and environmental impacts.

Brad:

You can see in the lower right-hand corner, the number of participants so far. So, we almost have 30 that have weighed in. I'm guessing we should see 75-ish. So, we'll wait a second and see if we can get a bunch

more participating. (silence) To the extent I can remember, how other settings responded to these questions. I'll be sure to remind you or let you know. For example, I remember which of the issues here got the most votes in the previous settings, and I'll share that in just a moment. Another 10 seconds Jen, and we can go ahead and show the results. (silence)

Brad:

I think we're good. Exactly the same as every setting, the most popular answer has been, C, across all now, five venues. An interest and understanding, and this is what the topics tonight's about. Let me boil it down very quickly. It's when you make decisions, as they relate to this IRP process, you have to consider trade-offs of, what are the costs factors? We want to have an affordable product, like Tim just described, "Eighth in the country, strikes me as remarkable." You want to make sure you're continuing to have reliability and resiliency. You want to make sure also that you very carefully consider the environmental impact. So those trade-offs will be important. That's what you'll hear us talk about this evening. The agenda is as follows. We have about three hours and if we don't take all that, that's fine, but we can't go past nine.

Brad:

So just know we need to stop at nine. Because we do have a large room, I'll also echo what Tim said. Brevity of comment is a strong request. We've had a couple of settings where folks want to, my words, drone on for many minutes, and one you've lost your audience, right? Nobody's listening to you after about two minutes. It's also a bit selfish and rude because other folks that want to participate may get squeezed out. So please be brief with your comments. The agenda will be, we're going to hear from the gentlemen to my right from EPRI. EPRI is Electric Power Research Institute, they are the experts in the industry around research and development, scientists, and engineers that support all range of utilities across the country. He's going to try to get us kind of all level set.

Brad:

I fully appreciate many of you work in the industry, and you don't need an education on how the electric system works, but there are many that aren't. We want to make sure everybody has a basic understanding of how the electric system works. Then also a basic understanding of again, the trade-offs and the risks that we ought to be thinking about as a power utility. So, we'll take about 45 minutes, we'll hear from Alan. Then will come out and will... A couple of polling questions in there, and then we'll open it up for comments and questions, 20 or 30 minutes. Then we'll take a very short break. Then we'll come back, we'll hear from Tom Kent the CEO at NPPD, he'll provide a view that the leadership and the board have been wrestling with on this very important topic.

Brad:

Then we'll go back to Q and A with Tom, and comments. So, again, concluding at nine o'clock. Lastly, this handout, that you saw at the table, just know that every slide you're going to see tonight is within this handout. So, if you want to take notes, or if you want to have a hard copy of today's sessions, it's all in there, including the polling questions. I think that concludes my introductory remarks. So let me introduce Allen Dennis. So, ` Alan again is with EPRI, Electric Power Research Institute. He is the senior program manager at EPRI. He started and leads the electrification activities at EPRI. I could describe all, maybe the

two or three big issues that are taking place in the industry right now. One of them, is wrestling with de-carbonization that's tonight. Another one is electrification, that's what Allen leads for EPRI. He's got 40 years of experience in the industry, knows it well, and with that, I'll turn it over to you, sir. So, thank you.

Allen Dennis:

Thank you, Brad. Good evening, everyone. Just quickly want to give you an overview, the Electric Power Research Institute, or EPRI. So, our mission is really to bring together resources, to look at innovative solutions that are driving change in the power industry. Really focused around safety, reliability, affordability, and environmental issues. We're funded primarily through utilities. That's where the majority of our funding, not only in the U S, but we are a worldwide company and we do get some money. We do some grant work with the department of energy, recently with department of defense, and some agencies in California and some other states. Primarily it is the industry itself that funds us to do the research.

Allen Dennis:

We're an independent organization. We pride ourselves; folks can come into organizations and influence and try to influence, our feeling is for the folks that are funding us. They want the true answer, as best as we can do it. It may be what they may not want to hear, but at least it's the answer that we come up with from the technical side of the organization. I'd much rather know where I stand, to do something about it, than if it's biased. So, that's really what our focus is at EPRI. We're non-profit. Again, our whole idea is we want to bring together not only experts within EPRI, but other industry experts. Those can be Academia, they can be some of the labs that are the national labs that we work with, a wide variety, universities, colleges of folks, and again, with the utilities, and quite frankly customers are part of that engagement and that collaborative effort. Strategically, some of the current themes that we have going on, and you'll hear on my second part of my talk, around low carbon resources.

Allen Dennis:

So, we actually have a very large initiative working, interestingly enough, with some of the petroleum industry, the natural gas industry around hydrogen and ammonia, and some other low carbon resources, along with some of the renewables that we focus on. We focus on end use customers also. Many times, end use customers want to know how can they reduce some of their carbon impact, so again, that's a focus area. You can imagine system reliability and resiliency is becoming more and more of the forefront, you've seen that happen certainly this last winter, it happens in many times during the year. There are certain events that occur and the more robust that we can make the electric grid, the better off everyone is. So, with that, then drives flexibility and how all of the grid equipment may then talk to each other, there may be some flexibility in how you operate it, managing peaks, just a wide variety that we look at.

Allen Dennis:

Again, as I mentioned, how do we educate and inform policy? So, we have an advisory group at EPRI, that's made up of state commissioners, it's made up of some of the state's political folks, on that committee. So, it's a public facing committee as one of our advisory folks. We want to educate again, we

feel the best person is a well-educated person, and then making a conscious decision what people and how they want to move forward.

Allen Dennis:

So, if we look at the integrated grid themselves, and you can imagine, there's a lot of technology that's happening very quickly you can see that even on your smartphone, right? What occurred five years ago, you have great innovations with apps and other things that didn't exist five years ago that exist today. Likewise, on the power industry, there's a lot of very creative people out there, doing a lot of really cool stuff. Ultimately it gets down to how you serve customers, again, affordably, reliably, through sustainability, with the resilience in the system. That's really what we're targeting when we look at our research that we go through at EPRI. So just a very quick history. If you look at the late 1800s, you had Edison, you had Tesla, along with Westinghouse. Edison's focus was around direct current in generating power, through direct current. Tesla and Westinghouse, we're looking at alternating current. You're sitting there going, "Allen, why in the world are you telling me this?" Other than maybe a bar trivia contest, you may win someday because... Right? Win a few beers off of bar trivia.

Allen Dennis:

It's because when you're looking at DC, the generator has to be very close to the source. When you're looking at alternating current, you can have a central station, and then use transmission system to move that power, that's a very important concept, when the power grid was established. Again, I'll get into that here a little bit more. Then along with that came in the early 1900s, a very important act, was the electrification of rural US, right? My mom grew up on a farm just north of Sioux falls. My dad grew up on a farm in Iowa, communities of 500 person.

Allen Dennis:

My mom, if you want to ever get her going, tell her, "Oh, the good old days." Well, those weren't really great, good old days on the farm. They didn't have power back when they were out on their farm, they didn't have running water, until she was 17. Along came electrification, improved the standard of living tremendously, through rural electric associations, and where you can now electrify rural America. So, this was a very important process. NPPD was established in 1970s, but even before that, you had public power meeting the needs of these communities and helping elevate the standard of living.

Allen Dennis:

So, when we go through this and we look at how power is generated just very quickly, you have, as I mentioned before that alternating current, you have a generator out there, and then you put that power onto a transmission line that then goes, and I'll explain this a little bit more, into what refer to as a substation. Then it's distributed in the cities and then to homes and businesses. So, when we look at this, we say... So, if you look back, oh, probably up until maybe the last 30 years, most cities, certainly in Nebraska, what did you have? You had a small power plant, usually located in all these little cities across Nebraska, Kansas, Oklahoma, and who was probably one of the most valuable people in the city, the person that knew how to kick the generator to get it started again when it went off, because you didn't have power until that generator started back up, right?

Allen Dennis:

So central transmission helped alleviate that, help tie communities together, and make it much more reliable. So, when we get to the different types of generation that can be out there, you look at NPPD, and they have a very diverse load. You have wind, you have natural gas, power generation, you have coal, solar, nuclear, hydro. It's a very diverse group because you don't put all your eggs in one basket. You want to kind of spread it around and looking and seeing what's out there. So again, you can look at each of these plants and you can see where they're located, and it's a very diverse, generation mix. So back to transmission.

Allen Dennis:

So why in the world do you have a transmission line, a high voltage transmission line and a transmission line that voltage on that line can run anywhere from maybe, oh, 230,000 volts, up to a million volts. It's because whenever you move electricity on a line, you have losses. You don't get as much on the back end as what you started with on the front end. The higher you can get that voltage, the lower your losses are, okay? So, you have high voltage lines that will move power a long distance, and you don't have a lot of losses. So then when you get to a city, every house can't be served with that hundreds of thousands of volts, right? At your house, you have 120 volts, for most stuff. Then typically, if you have an electric dryer or an oven, you have 240 volts. So, you have to get that high voltage down. The problem is, at your home, that last little segment has huge losses because it's very low voltage, and you want to that to a minimum, that distance, you want to keep the voltage up.

Allen Dennis:

So, the way you step from one area to another, transmission line. So, what happens if you go from a transmission line to what we refer to as a distribution line. The distribution line, typically, and utilities run different voltages, it can run from anywhere from 4,000 volts to 25,000 volts. So, you're not talking hundreds of thousands, but you're talking kind of a mid-range, why? Losses are lower. So, you want to run that voltage is as high as possible, as close as to whoever is going to use it. Then probably outside every one of your homes, or outside every one of your home, you have a transformer that takes it from that distribution voltage down to what you use in your house.

Allen Dennis:

So, as I mentioned, the distribution voltage in the cities, typically can run anywhere 4,000 volts, 25,000 volts, different systems use different voltages. The key here is you want to keep the voltage as high as possible. The reason I'm bringing all this up again, other than again, in the bar trivia contests you can win after this presentation, is the world's changing. I'm going to go through some of those changes, and that's why we're here.

PART 1 OF 6 ENDS [00:31:04]

Allen Dennis:

through some of those changes, and that's why we're here to some extent tonight. You'll hear that on the second part of my presentation. But understand, the very, very high voltage, you have low losses as you get closer to your home, you have higher losses. So, if you look at the left side of this chart, you show how all of these resources feed into the electric grid, this supply piece. Then on the right side, it's some of the end-use technologies of what's happening here. Again, I'll get into this a little bit more, but your local power companies are serving all of these loads on the right side, or it could be NPPD in certain cases, and then how you have the generation on the left side. Mentioned all these little cities that have their own little generators in the past, that when all that became connected.

Allen Dennis:

Now, all of a sudden you have this very robust grid, and NPPD, it's the Southwest Power Pool, and now everyone kind of backs up each other. So, you're not relying on one generator to start. You have now a lot of generators, all backing each other up. From a reliability standpoint, it's a very reliable system. Again, this is through the Southwest Power Pool and you can see the states and there's a wide variety of different utilities in each of those, but they're all there to help each other out, to back each other up, and so you have all these different generation resources that ensures a higher reliability, because at the end of the day, what are you after? You're after reliable power, affordable power, resiliency, you want to make sure you have a robust system, and do it sustainably.

Allen Dennis:

I'll come back and have reinforced these things as we go through it, but it gives you an idea of it's a balance, it's a mix. You don't get something for nothing. How do you make sure that the system operates well, but then also is affordable for folks as you move forward? Then ultimately you look at seeing how businesses are regulated, and you certainly have costs, and utilities have costs, and how do you recover those costs? That's important too. Again, you engage customers along that process to ensure, again, they're getting a value for the money that they're spending. So, with that, I'm going to turn it back over to Brad, and we're going to go through some questions.

Brad:

All right. Two more polling questions. So, this first one is only available on the pollev.com not the texting. So pretty straightforward out of these three factors that we're going to be talking about this evening. If you had to prioritize them one, two, three, if you actually just hover over each of those bars within that website, you'll see an arrow up and down on the left-hand side and you'll be able to move the bars and just rank them one, two and three. Again, I'll share with you what the other locations, what they ranked the highest in all cases, every place, everybody, ranked one of these much higher than the other two.

Brad:

We got 30 folks in so far. Give it another 30 seconds. Well, we've got more on now than we had before. Good. What's going to shape. We could punch through 50, but I guess we'll go with 52. That's good. Okay. Exactly what those problems are. Liability slash resiliency. I always just kind of go with reliability, but you'll hear both talked about tonight. In all cases was the number one item selected. Interestingly, the other two kind of went back and forth between all the other session. So, I would suggest that reliability

overwhelmingly as the top issue, and environmental and cost kind of depends on the setting and the group that was at that particular session. So, I'm sure the survey, the thousand plus survey respondents we have thus far will kind of tease this out a little bit more.

Brad:

So, one more question. This is actually my favorite one out of all of them. When you hear the word de-carbonization... I mean, the topic of today's discussion ultimately is about de-carbonization and what should we do, and how fast should we do it. When you hear that word, if you had to type in one word, what would it be?

Brad:

Positive, negative, curious, necessary, unnecessary. What would be one word? We'll put up a word cloud here in a moment and the word cloud here the larger words are the ones that received the more votes. And again, depending on setting, we received a wide range of words. 45 folks so far. This takes Jen, just a moment. She has to go through and screen these to make sure people aren't putting inappropriate words. So, fellows if you were trying to slide something through, unless she misses that, it just got screened out. Let me share a quick factoid. So don't put that up Jen, until I... That might be interesting. When we talk about CO2 emissions. Again, I know many of you know this, the United States is not the number one CO2 emitter in the world.

Brad:

It certainly is a major contributor, but China is overwhelmingly number one, more than twice what the United States emits. The number one emitter of CO2 emissions in the United States is now the transportation sector. For most of the past many years it was that utility sector. It peaked in 2007, the utility sector, at about 2500 million tons a year. Then of course, 2008 and '09 with the recession load went way down. So, we saw a big decrease in those years. It's primarily attributable to the economy and the recession and the lower load. But then of course, the economy turned and that the sector has done a wonderful job of continuing to manage CO2. So today it was 2500 million tons, and today it's less than 1500 million tons. So, a greater than a 40% reduction in the past 13 years or so. As a result, transportation is now number one, utilities number two, other major industry would be number three. So those are the kind of the three major segments.

Brad:

So wonderful progress is being made, but there's no question, there was overwhelming pressure to continue that progress. Again, that's what we talking about this evening. So, with that, let's see what the word cloud reveals. So, before this [inaudible 00:38:15] in what that suggests is many, many folks put expensive. When you hear decarbonization you put expensive, but you see a lot of other words, regulation, challenging, sustainable, unnecessary, problematic. I'm trying to find someone on the other side of the... You see green, you see economy, we had other settings I'm trying to think... Expensive was certainly a word that we saw as the number one word. I know one setting, maybe two, but there were one or two settings. It was the other side of the coin. I can't remember the words but necessary, required

those sorts of things. So, I find it fascinating that kind of depending on where you are, and of course who's in the audience, you get a feel for where their heads are on this important topic.

Brad:

So that's what this looks like. Our next topic is we're going to go back to Alan so that the last session was just grounding. So again, if you're in the industry, you probably understand generation, transmission, distribution, et cetera. Now we're going to talk about business risks as it relates to carbon, and issues as it relates to decarbonization. So, we're going to take another 25 or so minutes. I'm going to turn it back over to Alan and then we'll seek your comments. So, if you have some thoughts on your mind, please be thinking about those so we can hear from you in a few minutes.

Allen Dennis:

So, I'm going to go over five areas in the business risk discussion, first of all, how are the energy systems transforming? Again, there's some interesting things that are happening there. What does decarbonization mean? You hear a lot of terms out there, and we want to try to see if we can benchmark some of those terms for you and at least get a common understanding. What some of the current policies and are being looked at? So, you're seeing carbon in the forefront of many policies, not only in the US but certainly worldwide. What are some of the potential risks of de-carbonization? We also have some slides on where NPPD is with some of its carbon free resources. To give you a feel for what, again, the folks at NPPD have been doing. So, if we look at four areas, we look at energy systems, and again, I'll have a further discussion on each one of these.

Allen Dennis:

We look at how systems are starting to integrate. We look at the community and it's becoming more and more in the forefront, certainly the environmental aspects, then economy-wide de-carbonization, are the four areas. So, if we start with the energy supply, clearly, we want, as I mentioned earlier, how do you ensure low costs, or you want to ensure low-cost access to energy. There's a number of ways to do that. Transmission, in some cases, you may want to put some of the generation closer to the lows. We explain you may have some system operational benefits doing that. You also want regional mix again. Some of that's driven by transmission, where are the transmission lines to move it? Are they overloaded? Can you get from point A to point B? That becomes, as you see in certain areas in states, or certainly in the nation, that becomes more difficult in certain aspects of it.

Allen Dennis:

Then how are societal priorities changing? That's a big one that's changed. I've seen huge changes even over the last five years. So, all of this gets into how do you supply energy? If you look at where the US energy supply mix has been, and this goes from 2004 to 2019, you can see by this chart call has decreased. There's been a shutting down of coal plants, literally across the nation. It hasn't really been specific in one area. You see some of the petroleum plants that have been running. A decrease in those plants. Natural gas has actually increased, and you look, and you talk with the natural gas industry folks, and they see themselves as kind of this transitional fuel in the generation mix. Nuclear is about constant. Wind started

from almost zero, it has been growing quickly along with solar and then wood and biomass leveled off and stayed about the same.

Allen Dennis:

So, if you look from a percentage standpoint of the US generation market, you look and you see, for example, coal has decreased from 50% down to about 23%. Natural gas is increased from about 18% to 38%. Again, this is the US. Wind essentially zero in 2004 and that's gone up to 7%. So, you've seen a lot of growth in those areas. So, as you look at this bottom graphic, again, it's reinforcing that coal his decrease, natural gas is increase, nuclear and hydro stayed about the same, wind and solar have increased. So, a question you may have is, "where's NPPD on carbon free resources?" So, if you look in 2005 NPPD's generation of its energy was about 30%, 29.5% from carbon free resources in 2005, and 2020, that increase to a bit over 45%. Huge increase on carbon free resources for NPPD. Again, you can look and see how coal has decreased a bit. Nuclear is increased. Wind is increase, and it starts to help frame and educate folks on where from your particular utility, where you're at. So that was on the supply side.

Allen Dennis:

So, you see on the generation, this whole dynamic of what's happening with, with coal and wind and solar and natural gas. So now you look at the integrated systems, and what I mean by this, or you start looking at some of the end use technology, or I'll go through some of those here in a minute. You're seeing an increase in efficiency and reliability is certainly an area. Flexibility and security, every time you have a connection. You want to make sure that's a secure connection. You want to make sure that you have flexibility in any of kinds of loads. The more flexibility you can have potentially the cheaper because you can leverage that resource in a variety of different ways. Customers are becoming far more engaged than what they were. I've seen this even through my career over 40 years, certainly they were engaged to some extent 40 years ago, but today they internally get a lot of pressure to get more active and get more active in the utility and the operation and then decision-making.

Allen Dennis:

So, a business risk or potentially an opportunity. When you look at a system it's becoming far more complex. You start looking and bi-directional flows. Let's take an electric vehicle for example. You can charge that electric vehicle maybe overnight, and now we've been researching at one of our labs to Knoxville, how then that electric vehicle then can supply power to the grid during the day. If it's just parked, you now have a way of leveraging the batteries. It's kind of a mini generator. When you could use it and you're seeing more and more storage on your system. So, remember when I had said in the first part of this presentation, the world's changing, that's part of the change. As you start looking and seeing what's out there in a central power plant to what are called distributed energy resources, DER, and you're seeing more and more of that on systems.

Allen Dennis:

It's complex. Everything operates a little differently. From a business risk from the utility, you have to understand all that. You have to understand how it all operates. You have to understand what the impact is to the electric lines. All of this has an interplay. A question was brought up the other night around solar,

put solar in your home, right? One of the most aggressive states in the nation is Hawaii. Out there in the middle of the ocean, you don't have the Southwest Power Pool to back you up, you're on your own. So, in Hawaii, they want to go a hundred percent renewable by, I think it's year 2025. If you've been to Hawaii recently, they have solar panels on everything.

Allen Dennis:

So, one of the research things we do, remember the reliability and the resiliency of the system. What happens when a cloud goes over? What happens to your voltage on the system? All these things then, because now you don't have a central power plant, like Hawaii had operated for years. Now, you have all these distributed generation sources feeding into the grid. It's important to understand all this. Again, a business risk or an opportunity as you see what customers want. Another area is just the community. You're seeing and you heard... How many folks have heard the terminology, environmental justice? Have you heard that? You're hearing more and more, you will hear more and more of it. It's how do certain communities' benefit? What is the benefit of everyone for decarbonization? Again, it's an area where you say, how does land, how does air, how does water, all fit in to the future around de-carbonization, public health and safety? All of these kinds of things are becoming more and more of the forefront in many areas across the nation.

Allen Dennis:

How you look at the status and economic status, again, of folks is becoming more and more of a focus in certain areas. Decarbonization although we talk about it now, we've been doing it for years. I started in a utility in Colorado, and we were doing energy. We had energy efficiency programs where we would pay incentives to our customers in 1985. So, you look at this and you say, you have efficient lighting, you have smart thermostats, you have other control devices that help you optimize this around energy efficiency. That power that you're using is becoming more efficient along with that, the generation sources, as we described earlier, and you saw some of the NPPDs generation mix around wind and solar and nuclear, all of those things have been occurring for decades.

Allen Dennis:

So now we go into the transition around efficient electrification. You're looking at electric vehicles. You're offsetting gasoline, typically with electricity. So, you're going to see more and more of that. Some of the new heat pump technologies are really cool that we're testing, and highly efficient. Heat pumped water heaters, highly efficient, and you're seeing more and more of these technologies. Every day, in our research, companies are driving more and more of these technologies. So again, it even becomes more complex, but an opportunity for decarbonization. Then, as I mentioned on the first part of the presentation, we talked about coal. We talk about natural gas. We talked about wind. Guess what else is on the horizon, hydrogen and ammonia. You say, "Well, how do you make hydrogen?" Well, a typical way you may make it is you take a water molecule of hydrogen and oxygen H<sub>2</sub>O. You split it, you get oxygen and hydrogen. How you may want to split it? Using electrolysis, which then requires power. So, it's a way to produce hydrogen. That's one method. You could use natural gas and others to do it.

Allen Dennis:

My only point in saying that is there's on the horizon, new low carbon fuel's out there, see how complex this is. A business risk, right? You start seeing as Brad and Tim mentioned, the integrated resource plant. How do you take all these pieces and optimize them for customers? So, let's go through some definitions. So, the first one is a hundred percent renewable. As the name denotes, typically what these generation sources are solar and wind. You're not using a fossil fuel to produce the power. It could have battery storage so you have power when the sun ain't shining and the wind name blowing, you have storage so you'll have power and you're not out of power. As I mentioned, hydrogen, also, maybe how well it's doing, how it's produced a renewable energy.

Allen Dennis:

Then a term you'll hear is carbon free. Typically, what you add into the mix is nuclear. Carbon free. Then the last, which is now the industry buzzword is net carbon zero. How many folks have you heard of net carbon zero? You're hearing more and more of it. Basically, that means is that at the end of the day, I want to look at my usage of carbon and I want to drive it to zero. A lot of businesses are very focused on net carbon zero right now. So, let's say you have an industrial plant and you use natural gas in a boiler that produces steam, and that natural gas, carbon-based fuel, you're using so many tons of carbon every year to produce that steam, carbon usage. You want to drive to zero. Well, you have to do an offset. You have to do a credit or something that then would get you back to zero because you're negative right now because you're using all this natural gas to produce your steam. How do you do it?

Allen Dennis:

People, there's a wide variety of different ways for the offset. Let's maybe just as an example, maybe you have a forklift it's runs on diesel or propane, and you're going to convert that forklift to an electric forklift. There is some carbon reduction based on the fuel mix because of the Carbon free resources of about half the power. It gives you a credit around that carbon reduction. Typically, when folks go through a net carbon zero, they set a benchmark and that can be anywhere, maybe 2005 [inaudible 00:53:56] 2010, 2015, you set a date and you say, "I'm going to add up all the carbon that I use on that date, and then I want to get net carbon zero by a certain date." Typically, the industry has that date of the year 2050. So, it gives you time to look at offsets to see how you can get to net carbon zero.

Allen Dennis:

So, you look at this and you say, "All right, what's happening?" And many countries right now, certainly you've had the discussion in the US but if you, at Europe, you look at the far East, they've had these discussions for a long time, and are establishing maximum carbon emissions. In certain cases, they may have a carbon tax or another thing called a cap and trade. You set a level, and you're going to exceed that level. There's a number of ways that people can set the level maximum level. So typically, you hear a lot of times that if you use carbon and it's a certain amount that you're going to be having a tax. That's one way of looking at it. Then the Paris agreement that was established, there's actually a very complex modeling that goes around that, and they have targeted to two and a half degrees Celsius for the earth temperature rise and looking at how the world can accomplish that.

Allen Dennis:

So, the key to that is though, you can argue the level and you can argue the politics around it, but what's it doing? It's now establishing how it's calculated, how it's trapped, how it's recorded. You're starting to see the framework around the industry in decarbonization. That's a business risk, potential opportunity.

Allen Dennis:

If you look, and we talked just briefly on carbon, and you've seen some areas, California, you look at the Northeast, you look at Europe, typically you may see around \$30 a ton for carbon. Some estimates say that that'll grow over time. Typically, if you price that, it's what is an alternative measure to offset that carbon tax. Again, a lot of discussion around this, putting in place from a regulatory standpoint. If indeed you're using carbon and when we head down the road of a carbon tax, a business risk, right? Potential opportunity. Then adding to that, you now have customer's role in the mix, right? So, this has been talking about utility, but now you look at your customers. As the utility serves that, 90% of the standard and Poor's 500 companies have published sustainability reports. There were only 20% in 2011, and you hear it on the TV all the time, right?

Allen Dennis:

They're driving carbon out of their process. They're really looking to be sustainable and carbon free. 163 fortune 500 companies have headquarters in other countries in 23 countries of the fortune 500, and multinational companies are needing green power to hit their goals. Before I worked at EPRI, I worked for Utility in Kansas City, and we served in and around Kansas City, a part of Missouri, and part of Kansas. Of our top 10 customers, six had European based headquarters. I'll tell you as of 10-15 years ago, they were honest all the time to reduce carbon, because Europe was ahead, right? The whole Paris agreement, before that was Kyoto protocol, they are going 90 miles an hour, and they're pushing that back on the plants in the US. Very real example of carbon reduction that had nothing to do with US, but had to do with their corporate headquarters located someplace else in the world. Business risk? It's a business risk. Again, could be an opportunity.

Allen Dennis:

So, when we look at this, going back to the same chart, we look at about 30% carbon free for NPPD. Now growing to 45%, what's the future hold. That's why the public meetings, that's why your input's important, is NPPD starts down this road of looking at it's resource mix. Again, we come back to the four pillars. We look at reliability, resiliency, affordability, and sustainability. It's a balance. You don't get something for nothing, but it's the key of how all of those integrate together to help maximize, again, the value that everyone's getting in the power that they use. So, with that, I'll turn it back to the Brad.

Brad:

Alan, thank you. As you might imagine, another polling question or two, and then we'll open it up to some public comments and seek your feedback. So, the first question is this based on what you've heard around this topic of de-carbonization. If you had to select one of these three, which would it be that you're concerned about the risk of doing nothing, not staying, keeping pace with this, the pressure that's on NPPD, the risk of not knowing how we're going to get there, or the third one at this stage. You're not really too concerned about decarbonization.

Brad:

If you had to select one of those. Punched through 50. So that's good. I think we're good. I might've predicted that based on the earlier polling question, so that the not too concerned about decarbonization from this audience, I don't remember what the results were from the other ones, but again, I think that aligns with the general feedback from the previous two. How about this one? When you look at NPPD current energy supply mix, we call it was highly diversified, all major technologies are within the supply mix, the current carbon free is about 45%. How would you characterize it? A bit too ambitious in terms of some of the changes that's been occurring, that it's doing more than enough, but not too ambitious. You can read the options. Where would you place your bet on that one? We're good. I'm curious to see what this is. So, about the right pace. Too ambitious will be coming in second, and then far behind where it should be essentially comes in third. Although if you add the first two, you get about 40%.

Brad:

So, the majority, again, I think in line with the previous couple of questions, suggest that either we're at the right pace or-

PART 2 OF 6 ENDS [01:02:04]

Brad:

Full of questions suggest that, either we're at the right pace, or maybe we're moving a little bit quicker than some would like, but there's certainly a reasonable handful here, the 17% and the 10 about a quarter, they think we need to... We need to do more and do it quicker. So, what we'd like to do back to the agenda is we'd love to hear from you a little bit on this topic.

Brad:

Again, we're going to hear from Mr. Kent a little bit. I know that will prompt some questions and some discussion. But if you have any immediate thoughts on this topic of de-carbonization, we'd welcome you to come up to a mic, again state your name and city and power provider. Brevity is requested. But please, if anybody has a thought on this topic, please feel free to come up and let us know. Yes, sir. Unless you're headed out the back door.

### 3.5.0 Public Comments

Tony Leiding:

[inaudible 01:02:55]

Brad:

I'm sorry. It should be on.

Tony Leiding:

All right here. [inaudible 01:03:05]. How about now? Good evening, everyone. My name is Tony Leiding, Southwest Public Power District. I'm the president of Trenton Agri Products LLC. We're a 50-million-gallon ethanol plant located near the village of Trenton, Nebraska. A few thoughts, a reliable and affordable electric grid is essential to the continued viability of our business. We are a large electric consumer. Our plant uses approximately 70,000 kWh of electricity per day. That's about more than 25,000 MWh per year.

Tony Leiding:

I must say the electric services provided by Southwest Public Power District and NPPD over the last 17 years of operation have been exemplary. Our reliable electric grid in Nebraska as a competitive advantage. Looking ahead into the future, it is vital that we provide a reliable and affordable electric grid for Nebraska citizens and businesses. True baseload in the form of coal, natural gas, and nuclear is essential. Putting our grid at risk to simply meet arbitrary goals would be detrimental to both individuals and businesses.

Tony Leiding:

As we look to decarbonize the grid, I would offer the following, focus on making existing facilities, less carbon intensive through carbon capture utilization and storage. Nebraska has geologic formations for sequence duration opportunities. CCUS can make an immediate impact on carbon intensity while stimulating other businesses and bringing federal credits this state in the form of IRS 45Q credits, if we feel the reliability of our grid is at risk.

Tony Leiding:

Our business at Trenton Agri Products will be forced into evaluating and potentially installing backup power generation on site. This would most likely be done through diesel power generation, which would defeat the point of reducing carbon emissions upstream, just to add emissions at the user. The ethanol process like many other processes relies on continuous power to remain safe and efficient.

Tony Leiding:

We operate our facility 24 hours a day, seven days a week, 365 days a year. You simply cannot turn these facilities on and off due to self-imposed reliability issues like intentional brownouts and other grid limiting management techniques. One last note for NPPD, if you're truly devoted to carbon reduction, this can be achieved in a small way by blending more ethanol in your gasoline fleet vehicles. That's something we can do today that no cost. Through doing this, you can make an immediate impact while saving money at the pump and benefiting Nebraska farmers, ranchers and businesses. Thank you everyone.

Brad:

Thank you, sir. Yes, ma'am.

May Dean Farlander:

I am May Dean Farlander from Mendez, and I'm here to represent my grandchildren, my great-grandchildren and the planet. The cost to business, the cost to us as individuals right now should not be considered as important as the cost to the planet, and what is happening in climate change. Thank you.

Brad:

Thank you very much. There you go. I'll help you.

Trent Loos:

Thank you. Trent Loos. Hazard, Nebraska. Custer Public Power. My only affiliation, the energies I produce a lot of hot air, if we could capture that blended with ethanol, we wouldn't need any electricity. So, that's about the end of that story. Well, by the way, I'm the very last person on the Custer Public Power line. So that's the last person that Rick Carlson worries about, if Rick Nelson, I forget. If I got power that's okay. But the third week of February, this year was a very much an enlightening experience for me.

Trent Loos:

We had rolling brownouts. It was 22 below at my house. We had pig barns without electricity. Fortunately, we had a generator running, but it caused me to do a little research into what was really going on. Why did a situation in Texas cause us to have rolling brownouts? In fact, I've got friends as far north, as North Dakota that had that.

Trent Loos:

Now we see this with the Southwest power pool and we understand why that is. I have a question. Mr. Dennis can answer when I get done, is it true that we have less than 12 systems in this country that produce a 100% of the electricity, which seems to me in a time when people around the world want to kill us, creates a tremendous amount of risk and vulnerability? I continue to hear people talking about de-carbonization. My word for de-carbonization didn't enter the word pool, because my phone's dead, I didn't have enough power.

Trent Loos:

Death, de-carbonization is death. We're sitting around here demonizing something. But as an essential element, we have ethanol plants, burying carbon. The atmosphere needs carbon. We have fuel plants all across this country, capturing carbon and selling it and creating a value for it, because it has the value to purpose. Here we are, we're spending all of our time. We haven't heard from Mr. Kent yet, but we're spending all of our time at this point, talking about how to get rid of something that is absolutely essential to our life.

Trent Loos:

What I'm really worried about is who's going to destroy these 12 substations or less and create a vulnerability and why I'm tied to North Dakota and Texas and whatever happens there seems to me that we should be looking to how we can achieve independence.

Trent Loos:

Because, I also met Mike [Nagy 01:09:34] in March who was a tremendous resource from Texas. He said that the experts in energy in the state of Texas have been telling people in the legislature in Texas for years, that if you're more than 30% dependent upon energy from something other than coal or natural gas, if you have wind and solar at a higher level than 30%, you're vulnerable. We lost power in Nebraska in February, because they have 34% of their electric supply coming from wind and solar, when they were told that's not reliable and now, I'm being told.

Trent Loos:

In fact, I heard somebody just say, NPPD is getting pressure to do this from who, certainly not the people in this room, certainly not the people we've had in five meetings around the country, putting pressure on us to increase our risk from who, people sitting in Washington, DC, that don't care about what's happening with our food supplies source right here in the great Plains of America that too. We need to stand up. This is going to be a very interesting meeting for me, because we were told at the beginning that this is about taking our ideas and incorporating them into our plans for the future. At this point, I see our ideas, John Lowe, they're coming from here, trying to convince us that death is the future.

Brad:

That's the first half-standing ovation we've seen. So, well done. Any other comments? Yes, please.

Dennis:

Well, I guess, since I was called out. Trent, thanks. When we look at alternative energy, wind, solar, it's a priority over our power lines and our power companies. That means our coal power plants and our gas power plants need to scale back. That doesn't work well for those power plants. They are reliable energy. We need to continue doing that. We need to continue to research electric as far as solar and wind energy. We need to continue to research. But right now, we have reliable energy in our coal and our gas.

Dennis:

It was cold. I was in Lincoln during those brownouts, blackouts, whatever we had. I was lucky, I was in a condo that was surrounded by other condos, because otherwise it was going to get really cold. That's because we did not have the supply. The supply of natural gas, it was cut short for a lot of the power companies. We supplied Texas with the power that they needed. Nebraska did a good job. We helped our neighbors, but we can only do that if we have reliable power. I don't believe the wind was blowing on those days either.

Brad:

Thank you. The February event has come up a lot. I'm sure Tom will talk a little bit about what took place in SPP. What I'd like to do is just take one minute and share with you. The ERCOT i.e., Texas failure was not renewable. It was natural gas and natural gas system at the wellhead pipelines all the way to the end-

user froze, because they had seven days of extended cold weather, which they just were not prepared to address. They had about a 70,000 MW shortfall, 50,000 of that. So, 5/7th was due to natural gas, not being available in the marketplace. So, a lot of it is attributable to the renewable side and some nonrenewable had some failures as well, but the vast majority of problems and in ERCOT, Texas was natural gas.

Tony Leiding:

Now, I believe in the ERCOT. Many of the systems that power those natural gas pipelines were powered by wind and solar. Were they not? Or the backups that did the compressing stations and provide a power out to the pumps to pump the natural gas, were wind and solar. So, when those fail, now you don't have an infrastructure to bring the natural gas onto the market, or when a natural gas producer has their power cut to not bring the very gas we need to market, due to renewables or a shortage, then that cuts off your infrastructure.

Brad:

Yeah. I'm not sure I would agree with that, but that's okay. Good enough. Yes, please.

Kathy Wilmar:

You said some interesting things and one of them Trent brought up was when you said you felt pressured. I'm not understanding how companies who think they want cleaner energy can come to somebody that makes the energy and some help put pressure on them. I don't feel an obligation to agenda 21, 2030, 2050. I don't feel an obligation to the Paris Agreement, that this to me is all garbage. If we're going to think about our grandchildren and our great-grandchildren, I do want something reliable and we have had it and we need to keep it. I just think this, sorry, very respectfully, this whole meeting is just exactly what Trent said, it's trying to convince us of something that we supposedly think we want and we don't, and we didn't ask for it.

Brad:

Thank you. Oh yeah. Ma'am, just so I can put it in there. Your name please, and city, just so I can...

Kathy Wilmar:

Kathy Wilmar, Beaver City.

Brad:

Kathy Wilmar, Beaver City. Thank you very much.

Celeste Hamlin Pinner:

Twin valley power supplier.

Brad:

I'm sorry? Twin valley power supplier. Thank you.

Hastings Makedonski:

Cool. Well, hi everybody. It's nice to be here. Nice to see everybody here. It's cool. You all care about all this so much.

Brad:

So, your name and city please.

Hastings Makedonski:

Hastings Makedonski. From what I've learned and everything, as long as we have a stable system, I mean, we also have a climate that's warming. So, I would prefer to not... I prefer to have a future instead of just have more coal and gas and stuff like that. So, I totally understand where you're coming from, understand everything you guys want. You just want a good world for your grandkids, your kids, but I also want to get a good future and I see it the opposite way. Thank you, guys.

Brad:

Thank you.

David Marsh:

First of all, thank you gentlemen, for taking your time. Of course, we can stop, I know there's various opinions here. We just moved here recently. My name's David Marsh. I'm from Sheldon, and Dawson powers are provider. But we saw a lot of this renewable energy in Kansas and then Oklahoma. The lady mentioned agenda 21, and there's a tremendous background to all this de-carbonization. A lot of it is political, and just like the wind and that highly subsidized tax credits, investment tax credits. Just kind of parting remark, Governor Keating in Oklahoma, he was the governor there in all the early part, like 2000, 2002 and Oklahoma bought in heavily like Texas did, especially in the wind area. He said, "we've made a mistake. We made a tragic mistake." So, if you want to do some more research, like it's mentioned, you need to back up quite a bit. Some of the other comments that were made about the brownouts, that's the result, that's the symptom of the problem. If I understand right coal and some of those other things over the years have really cleaned up their production and their carbon emissions. So, thank you.

Brad:

Thank you, very much.

Jim Edwards:

That's all?

Brad:

You're good.

Jim Edwards:

Would You put that in writing? My wife would like to see that.

Brad:

I'm at the mics. Good. I'm at the mic. Yeah.

Jim Edwards:

I'll get to it. You bet. My name is Jim Edwards. I'm a director at Loup Valleys. I just have a few comments here that might be a little controversial. I appreciate Mr. Lutes. But I think the ball rolling and this de-carbonization thing is slowly but surely going to happen. I'm not real excited about it, but the question is How fast and how do we get there? I think NPPD is trying to redefine Baseload. Baseload has to be on 24x7. And that's how you define baseload. There's also a lot of conversation about baseload. I went into that and I also feel that Our MPP board has changed in the last two election cycles, dramatically. I think a lot of that was funded by non-Nebraska money.

Jim Edwards:

We also have a good example of what happens when people don't think thoroughly, what might happen. The very good example is what happened to President Biden, right now. He thought, I'm sure, he thought he was doing the right thing. I'm positive, he thought he was doing the right thing, but we all know it turned out to be a 100% the wrong direction. So, another thing I picked up here, this net-zero reminds me. I'm a cattle feeder. It reminds me on how I made a \$100 a head on some cattle. Thought, I was going to lose two and all in lost one, so I made a \$100. So, I think that's how they're defining net-zero. Thank you very much.

Brad:

Thank you.

Randy Herbert Ravenna:

Yeah. Randy Herbert Ravenna. Now, the way I read the letter that I received, Gerald Gentlemen is running, burning all the coal, even with the wind power on, that there was really no reduction in coal usage. Maybe I misunderstood. It wouldn't be the first time that I misunderstood something, but if we're not saving coal, why are we having all the windmills out? I mean, Gerald Gentleman was running all the time, burning coal all the time because we have to have electricity in the system. So, if the wind goes down, we don't have brownouts. So, what good of are they? Why do we keep putting them up?

Randy Herbert Ravenna:

I've been driving down the interstate here a lot lately. I can't believe how many windmills I see Howard and blades moving down the interstate constantly and being built. But yet, is there a reduction in the coal usage out at Gerald Gentlemen, because the letter said, not really. That's the way I read it. I don't know what anybody else read, but I'm sitting there Wrong, why are we doing this? If we're not cutting coal and natural gas usage down, why are we bothered building all these plants, wind generation, because we have to have these to make them look pretty, make the countryside look pretty.

Randy Herbert Ravenna:

Let's talking to some people who've had a wind tower gets put up by their house, across the road. Every time the blade goes by shadows in their house, it's like a strobe light. Every time the blade goes by, it's a whoosh-whoosh, it's driving them nuts. It wasn't on their land. It was across the road. So, they didn't have any say about it. That's fact. These people built their dream house, and now their dream house is a nightmare.

Brad:

Thank you. We'll take one or two more and then we'll do again a very short break and then we'll transition to Tom, but perhaps you and I saw another lady stand up, so we'll get to you in just a moment, please.

Celeste Hamlin Pinner:

I'll be extremely brief. My name is Celeste Hamlin Pinner. I live in Wood River and we are Southern Public Power. I'm a mental health practitioner in private practice in Grand Island. I would just encourage each one of you to extensively research the flutter effect on the mental health and brain development of children. I think it will tell you a lot. Thank you.

Brad:

The flutter effect?

Celeste Hamlin Pinner:

Flutter effect.

Brad:

Thank you. Yes ma'am. Okay.

Beverly Pop:

I'm Beverly Pop from Loup City, NPPD. What I want to say is when NASA was shooting down, they were finding out that the Midwest, the corn farmers are adding a lot of... They have the most full synthesis in the world. They are taking up where the rainforests are dying down. We're losing the rain forest, but we

do have the corn. We need reliable power to keep the farmers farming that cannot change, because if we do, then we truly are ending up with a serious conservation problem.

Brad:

Thank you. Let me ask a quick question. Again, we normally take a break. We just have a lot of folks in here. I'm afraid. If we take a 10-minute break, it'd be hard to get everybody corralled. Do you? I'm seeing one signal back there. Say, keep going. Are you okay if we just continue and not take the break, let's do that. So, I didn't give Tom a chance to collect his thoughts, but let's transition and hear from Tom Kent. He can talk to you again a little bit about the process that NPPD is undertaking today and kind of where they are in their thought process. Then, I'm sure it will generate some additional questions and comments from the crowd. So, is that okay, Tom? I didn't mean to surprise you.

Tom Kent:

[inaudible 01:26:10]

Brad:

Oh, really? Do you folks want it, with folks? Yeah. How about I'm getting... All right. A quick break. Restrooms are just across the hall or down the hall. We have some refreshments. You'll hear me bark a five-minute warning here very shortly. So just five minutes.

Brad:

I've heard several experts talk about it. They said at the end of the day, if you had to pick whose fault was it, it was the gas system.

Brad:

I agree with that. No, I agree with that. Yeah. I agree with that.

Brad:

Well, he'll talk about SPP, that's come up a lot. Five minutes, five minutes.

Speaker 1:

Test, tech, tech, check, check, four minutes, four minutes.

Brad:

Two minutes. I know it's not going to happen. So, I'm accelerat...

Brad:

Let's get going. We do have that hard stop at 9:00. So, I like to get us started. I don't know if we'll need all that time or not, but if we do, I'd like to get us going.

PART 3 OF 6 ENDS [01:33:04]

Brad:

So let me go ahead and introduce our next speaker. I'm sure many, if not most or all of you know Tom Kent, CEO at NPPD. We've had a number of questions come up at the previous settings. The February event was one of those. So, I'm imagining he might touch on that and a couple of other common themes and questions that have come up. And then also, as we said, outline the current thinking and thought process that the board and the leadership at NPPD are undertaking as it relates to this topic of decarbonization. So, again, we have just under 90 minutes. If you have questions for Tom, we'll have time for those. And with that, Mr. Kent, I'll turn it over to you. So, thank you very much.

Brad:

[crosstalk 01:33:49]

### 3.5.1 Discussion Draft of SD-05

Tom Kent:

Thank you. Thank you, Brad and thank you all for being here tonight. First and second for coming back from break. So, you always take a chance when you give someone a break in the middle and the second act is, who knows what the second act is going to be, right? So, thank you for coming back. Really appreciate the comments and feedback we're receiving tonight. Before I get into the discussion of our strategic direction, and I'll talk more about what that is. I wanted to talk about... Answer some questions and explain from our perspective at NPPD, what we saw in the Southwest Power Pool in February. The February event which came up quite a bit. And then there was also the question, you said 12 substations I think, correct? Okay. So, I believe you're referring to an article that was in the Wall Street Journal several years back that talked about the potential for a limited number of substations across the country, if they were all struck, that could be devastating to the electric grids, reliability across the nation.

Tom Kent:

And talking general terms for a little bit, the electric grid in the United States is a very large interconnected machine. It's split into roughly three parts, ERCOT, which we talked about a little bit, Texas is its own grid. Basically, covers most of the state except for the Northern Panhandle and some around the periphery. The Eastern Interconnect of the United States, which we are part of right here today, basically runs along the Western border of Nebraska north and south through the country. And so, everything east of that with the exception of Texas, is part of an interconnected transmission grid where all the generation and transmission is operating in harmony as one big giant machine, largest machine on the planet. There's also the Western Interconnect of the United States, which does the same kind of thing, but it's for the West. So, it's from everything basically from the Eastern side of Wyoming to California.

Tom Kent:

And so, the utilities within that interconnect are interconnected, they call it an interconnect. They have to operate together; they have to follow rules and standards and practices to ensure reliable delivery electricity. There's not an economic way today to store electricity in large quantities, on utility scale quantities. So, the way the utilities have operated, as Alan discussed in the first session, the way utilities have operated since the dawn of utility time, is they provide a product that's used instantaneously by the consumer, right? So, when you turn a light switch on, there's a generator somewhere that's moving a little bit to provide that energy and when you turn a light switch off, there's a generator somewhere that's moving a little bit to not provide that energy anymore, to keep things in balance.

Tom Kent:

And so, utilities and entities like the Southwest Power Pool, which acts as a balancing authority, have a system that balances generation supply and demand on a real-time basis. Every second of every minute, every minute of every hour, every hour of every day, every day of every month and every month of every year. And that balance is what keeps the reliability high in our system. When that balance gets out of whack, if it gets out of whack far enough, the utilities have plans that they institute to bring things back in balance. And some of the tools they would use would be bring on more generation, bring on different generation. If things get out of whack enough and the generation tools are all used up and they have no more generation to bring on but they still can't bring the load back in balance with the generation, the next step is to start to shut off load. Which is what you saw in Texas in February and what you saw in the Southwest Power Pool in February and I'll talk a little more detail about that.

Tom Kent:

If you don't bring things back in balance and things get out of balance enough that you can't bring things back in balance, you run the risk of having a large, widespread, long-lasting heavily damaging outage that may last days, weeks or more. So, after the utilities and the reliability coordinators in the balancing areas are working to do that and taking those steps that are part of their emergency plans, the utilities also have designed in their system, automatic equipment, that if you can't manage it, the system will do things to manage it on its own automatically. We refer to that as, Under Frequency Load Shedding, and that's an automatic event. Something you don't want to see happen, but that's kind of the last step that's in the design of the reliability of the electric grid in the United States to ensure that you don't get in a situation where you have this long lasting, widespread, damaging outage that doesn't last a couple hours. It lasts days, weeks, months depending on how much damage was created in that event.

Tom Kent:

We've had a couple of those kinds of events in our history. 1965, there was a large outage in the Northeast part of the United States that lasted several days. A lot of the learnings that came from that established a lot of the reliability requirements and regulations that we follow today across this country. The actions you saw, the operators of the utilities take in February, were based on those learnings that happened in 1965. They're also based on learnings that happened with a large widespread outage that occurred in 2003. It happened to be in the same part of the United States, different causes.

Tom Kent:

But again, those learnings from those events caused the utility industry to really look at what kinds of changes need to be made to ensure that those kinds of events didn't happen again in that fashion. And a lot of the more modern regulations and the requirements to do things like vegetation management, trim your trees, come out of the learnings from those events of the past. But that's kind of the regulatory framework that we live in today. But at the end of the day, what utilities are trying to do to ensure reliable low-cost electricity for you, is to keep that in balance on a real-time basis. And as Alan mentioned in the first hour, that's becoming a more and more complex issue. The system over time was designed as a very kind of stiff system where electricity was generated in a central station and delivered to a customer.

Tom Kent:

Well, now, today you have of customers that are wanting to generate their own energy, you're having new kinds of reliability requirements and power quality requirements because today there's all these phones, sorry, your phone ran out of charge, I should have an extra battery for you, computers, electronic equipment that are much more sensitive to the quality of the power you get. And that's something that your utilities, your local utilities work hard to manage for you. So back to February. February events, the operators that are responsible for ensuring reliability, the reliability coordinator is what we call it in the industry, that's the Southwest Power Pool. And as Alan mentioned, we share risk across that pool and we lower our costs by the fact that we can share that risk. We share generation resources, we can balance things over a larger area that gives us the ability to use diversity to our benefit, to keep costs down for you and reliability up for you.

Tom Kent:

They saw the cold weather event coming. I'm going to talk mainly about the Southwest Power Pool. That's where we live. ERCOT is a little different. Texas, same kinds of underlying issues, much smaller geographic area, much smaller grids so their ability to manage the risks are different because they don't have the same opportunities for some of the diversity we see. So, one person mentioned that we were supplying electricity to Texas. Well, really, we weren't all the electricity that was being provided in the Southwest Power Pool was primarily going to the Southwest Power Pool in the height of the cold weather event. In fact, the Southwest Power Pool was importing a lot of energy during most of that event from other utilities to the east of us that are part of the same interconnect. The big reason that really, we weren't moving much electricity to Texas, is because between those interconnects, between Eastern United States and Western United States, or either the East and Western Texas, there's just a few lines that go in between.

Tom Kent:

So, it's like sending the electricity through a straw instead of through a big giant pipe. So, there's just not a lot of way to move a lot of energy back and forth between those interconnects. Some moves back and forth but certainly in an event like that, Texas was focused on managing what they could. They couldn't rely on the Eastern Interconnect because they are not physically part of the Eastern Interconnect. SPP was focusing on managing their issues. They could rely on the Eastern Interconnect for help just like the Northeast was relying on the Eastern Interconnect for help in 2003. If you were working in one of the operations centers that monitors that the power system in 2003 in Nebraska, you would've seen on your

dials that you used to monitor a disturbance going on because it was happening in the Northeast, but we're all connected together.

Tom Kent:

There's a lot of inherent benefit in having that big integrated system, we refer to it as an inertia. There's a lot of inertia, a lot of ability to keep things going. So back to the February event. We saw in the Southwest Power Pool gas prices get to the range of a hundred times roughly more than they normally are and that was driven by a couple of things. A, it was really cold. People like to use gas as they should, to do things like heat their homes and other important things when it's really cold. So, the demand for gas was very high and just like any other commodity demand goes up, supplies constrain, prices go up. B, the cold weather was impacting the ability of some of the gas supply facilities in the South and in Texas to provide gas. The details of all of the underlying relationships as to exactly why the gas supply was compromised from the cold weather, I think is yet to be finalized and worked out. But certainly, there was a gas supply shock that was also impacting price.

Tom Kent:

We have a large power plant in Southeast Nebraska that burns natural gas, it's what we refer to as a combined cycle power plant and we were running that with as much gas as we could get. And we had to have, NPPD had to have two emergency board meetings over that weekend in order to get authority to buy more gas because the cost of gas was so high. So that was part of the issue. We also saw in the Southwest Power Pool, in that 14-state region, a lot of power plants that normally are available to be counted on, we call that accredited to provide capacity, weren't available. Similar or issues in some cases, the power plants weren't winterized. They weren't prepared for that long extended cold weather. Some power plants had issues with coal. Their coal piles were frozen and they weren't able to get the coal off the pile to put in the boiler.

Tom Kent:

Some power plants were just out because of their normal outage schedules. Power plants have regular maintenance schedules and it just so happens, in any given month there's going to be a few power plants that are out for maintenance. And even as you try to get them back, which happened across the country, you don't always get them all back. We had one of our power plants out for maintenance that we were able to get buttoned back up, back together and put in service to support the cold weather. So, you got all those issues you got to deal with. So, the reliability coordinator, the utilities working with the reliability coordinator, were working to balance this load in generation.

Tom Kent:

And again, what happened? Because there was an unavailability of power plants due to a lack of fuel supply and due to the fact that some of the power plants weren't capable of running in the extended cold weather across this region, across the Eastern Interconnect, but mainly impacted the Southwest Power Pool and the RTO, the Regional Transmission Organization just to the east of us. MISO, it's called Midcontinent Independent System Operator, ran out of generation. Literally that's what happened. All the generation that could be running that we could get to run was running. The wind that was blowing

was being used, the solar that was shining was being used, the challenge as we've discussed and we heard in some of the comments with those types of resources, they're part of the mix, is that they're intermittent and so, they're not always there when you want them to be there and sometimes, they're there more than you'd like them to be there. And so, you have to manage that in order to ensure reliability. That's another function that the utilities provide, is managing that change in generation, as well as managing the change in load to ensure that you maintain the balance.

Tom Kent:

The forecast for the wind and the actual wind that showed up was roughly the same. So, the utilities actually got from the wind resource during that event kind of what they expected. So, we were ready to manage that and it came in kind of like the forecast center would. But again, all these other resources didn't show up and part of what we still have to learn and understand better is, the why didn't they show up? Peel the layers of the onion back. That the generation supply got maxed out, the load kept going up and the next step in the toolbox was, well, we got to bring things back in balance and the way that happened was by cutting the load. And you saw that in Nebraska in two different days. The first day, Monday, what is it? The 15th? It was about an hour. Each of the utilities in the Southwest Power Pool footprint provide their share of managing that difference to get things back in balance at the directive from the reliability coordinator.

Tom Kent:

And the second day, it was about two, two hours. And yeah, it sucked. It's the last thing a utility operator wants to see. It's the last thing that an operator that's sitting at the desk with the responsibility and the license nationally that says, they're responsible for ensuring the system remains in balance. The last thing they want to do. But by taking the steps they took that day, they prevented something that could have been a lot worse from happening. And so, it's still something that we need to learn from, it's still something we need to get better from just like we have in the past as an industry, but it prevented something worse from happening. It doesn't feel good. No one likes it when the lights go out. I don't like it when the lights go out. I get that. And there's lessons we can learn from that. So hopefully, that kind of helped explain kind of the Southwest Power Pool view of what happened.

Tom Kent:

Back to the 12 substations in the article from several years ago. As I mentioned, that interconnected grid, it's pretty resilient. It has the ability to ride through events, it has the ability to recover fairly quickly from events. And a lot of the work that we do with entities like EPRI, it's to learn how to use technology to do that even better and do that in even more automated fashion. And the reason it's resilient is because it's all interconnected. So, if you lose any one thing, the power by physics, generally will reroute itself and still provide electricity to the end use consumer. The challenge becomes is when you lose a whole lot of things at the same time like we saw with generation in February, or like we saw in the ice storm in Nebraska in 2005, 6, 6, 7? Whenever that was.

Tom Kent:

Everyone remembers that there was out here because you were in the middle of it. The transmission system in Nebraska in that ice storm was nearly severed in half. And in this area of the state, we had to

take some working with our wholesale customers, some pretty aggressive actions to get power supply back on while we took the several months to put the transmission system back together. And one of the things we did, is we ran it power plant south of Lexington, candidate station, to help provide electricity to the local area. That's one of the reasons we keep that power plant in service and it's been around since the 1950s and it helped us in the February event as well.

Tom Kent:

So, is it possible that if someone did a coordinated attack that was smart enough to understand how everything's interrelated and they took out enough of the components of the system, could it bring the system down? Yes, it's possible. It's harder to do than people think, it's a lot harder to do than I think the person that wrote the article in the Wall Street Journal was trying to say. But that's from an insider. There's a lot that goes on at the utility level, at the national level to address the issues around security of the power system. It's become a big issue over the last decade because of all the cybersecurity things and it's top of mind for everybody and it's certainly top of mind in our industry. We have a whole lot of different requirements that we have to follow. We've invested, we not just NPP, but the utility industry in general has invested a lot in adding defenses and additional robustness to ensure that we can do everything we can to prevent and a cyber event.

Tom Kent:

But the bad guys are still out there doing bad things, right? So, it's not like you ever have arrived and you know you're going to be a hundred percent safe because the bad guys are always getting smarter so we always have to get smarter. And there's a lot of work that goes into that. So, while it's possible, it's not a likely event in my opinion. And I don't say that to downplay it, because it's something we take very seriously and something we think about every day, not just at NPPD, but across the industry. But there's a lot of work that's going on to ensure the security and reliability of the transmission grid from those kinds of things. Not only in the utility industry, but from a national defense and a national security standpoint a portion of which I don't know about because I don't have the right security clearance, but it's going on. So. I think that there was a question from the first part. But again, when I'm done, we'll have time for more comment, more questions and thank you for being here.

Tom Kent:

I want to talk a little bit about what we refer to as, strategic directive five. In our board elected by you the public, part of the role is to provide oversight and set the policy direction for the district, the organization. And that's why we're here tonight, is to get your feedback on one particular policy aspect. They do that by setting what they call strategic directives. And so, we have a strategic directive or policy guidance from our board that talks about reliability expectations, what the expectations are for reliability. Talks about cost competitiveness or affordability, another strategic directive. Talks about safety. Talks about expectations for public outreach, expectations for customer service, there's like 10 of them. There's 11 of them. I was corrected by one of my board members, he's always right.

Tom Kent:

So, this is one that has to do with our generation resource mix. And it's talking about specifically the carbon emissions related to our generation resource mix. And as we look into the future, Brad mentioned this at the beginning, we do an integrated resource plan, do a deep dive into how best to serve our customers to assure affordability, to assure reliability and resilience and to meet our sustainability goals or obligations. We do that every five years roughly. And so, this policy guidance is part of that process for the board to say, "Here's the expectations." We are subject to several different regulations today that have to do with the emissions from our power plants and it's a business risk for us and a business opportunity for us.

Tom Kent:

And the issue around carbon is just another part of what we have to think about as we work with our customers to address how our power plants work to provide you reliable electricity while ensuring that we meet all the clean air act requirements, the clean water act requirements and all the other different rules and regulations that we're subject to as a utility. So, this is just another piece of that pie that we put in the consideration piece. Some of the things we've been doing, there's some things brought up in the discussion to think about how we can continue to evolve our generation mix, to reduce the carbon emissions over time. And as you saw in the presentation, we've come down quite a bit since 2005. A lot of that reduction since 2005 is really around our nuclear power plant operations. Cooper Nuclear Station, roughly an 800-megawatt power plant, something we would call a base load power plant, runs 24/7, except for when it's refueling outages. It provides carbon free electricity. It's part of that carbon free mix for ours.

Tom Kent:

And the big difference between 2005 and now with respect to Cooper, isn't before 2005, quite a bit of the output of that power plant was being sold to other utilities. So, we weren't counting it as part of what we used to serve our customers. Since 2005, those contracts have expired and we're using it to serve our customers so now we're getting credit for all that capability. And so, that's part of that reason. We also have some wind and solar, we have a lot of hydro, not so much owned hydro, but we do have some owned hydro in Nebraska, including right here in Carney, one of the oldest power plants in the state. We get a lot of our hydro power supply from the Western Area Power Administration, which comes from the Missouri River Basin through the [Pixel on Projects 01:57:10]. So that's part of the mix.

Tom Kent:

We're working hard with our customers to look at opportunities to do things like carbon sequestration, CCUS, CCS, carbon sequestration in storage. So, we've got working with other partners, some DOE grants to study the economic viability of doing things like adding carbon capture and sequestration to Gerald Gentleman station potentially. So, we're looking hard at those things. We're working with the ethanol industry. One of the other grants that we have working with the ethanol industry is looking at how you could take carbon from facilities like power plants or ethanol plants, put it in a pipeline and use it for some other purpose or just sequest it and store it. So, there's a lot going on there.

Tom Kent:

We're also working closely with the ag industry. We have a pilot project going on with one of the large cooperatives in Eastern Nebraska to study and understand how ag practices can help create credits or offsets, we talked about that a little bit, by the farmer, the rancher changing how they manage their crops to capture more carbon in the soil. So, if we can show through that project that we can capture and retain more carbon in the soil, that's an ability to create a credit that can be used as an offset down the road, if something like that makes sense. And it also creates the opportunity for the farmer to maybe get some more fertile soil for their production uses. So those kinds of things are going on, is examples of what we're looking at today. We are one of 21 companies in the United States that has the technical competence and the staff and the license from the Nuclear Regulatory Commission to safely operate a commercial nuclear power plant.

Tom Kent:

We've been a commercial nuclear power plant operator since before NPPD was formed. And it's an important part of our future. So, we're watching very closely and actively participating in some of the new technologies for nuclear. Ultimately, as we move forward, as we look at our integrated resource plan, as we think about where we should be going as a future, we need to ensure that we meet the expectations of our customers. And as you saw in some of the feedback in the polling tonight, reliability and affordability are up there at the top of the list. So, it's finding the right balance between reliable, resilient, affordable, and then those sustainability goals. So, the board and management we've worked together, we have a draft for discussion of what this strategic directive could say. And we're presenting it and we've been presenting over this past week to start, or in fact, really continue the dialogue that we started a couple of years ago with our customers.

Tom Kent:

We've been working through this process with our customers for about two years. It started with a team that was set up with some of our board members, some of our customers, and some of our staffs. Brad was the facilitator of that, where we started looking through and talking about some of the business issues, the business opportunities related to this. The board came out of that and asked for a couple of studies to be done to talk about kind of what could it look like? What are potential scenarios? And so, we had two vendors that did some analytics around three potential scenarios to give us a feel of issues, risks, costs, those kinds of things. That information was presented to our board and the public in March of this year and out of that process came the, let's spend some time, get some feedback from our customers, hear what they think about it, and that's why we're here tonight. And that's why the surveys out there for your feedback.

Tom Kent:

And so, the discussion draft that I'm going to start going through is truly a draft for discussion. Now, it's written like it's a thing, right? But it's really meant to stimulate discussion and provide feedback so the board can take that under consideration as they decide what, or if should be done in terms of policy guidance for NPPD in relation to our carbon emissions.

Tom Kent:

So, the first paragraph is really what I call the preamble. Okay? It just kind of states that there's real issues out there. Things we need to think about, things we need to consider and this is an important topic. The second paragraph, it's the goal and the goal was really to be net zero by 2050. So net zero, again, using the description, Alan talked about, it's a combination of our emissions from our generation fleet and any offsets we can create or get through various mechanism. I talked about some of the things that we're doing in the ag world for example, and our missions are going to be impacted by the kind of technology we would slack. So, carbon capture and storage becomes an economic technology, that makes sense, that helps lower emissions. For example, nuclear helps lower emissions, wind, and solar help lower our emissions.

Tom Kent:

Diversity is really important to us. Having a diverse resource mix helps us manage risk for all of our customers, for all of you and helps with affordability. So that's the goal. Next paragraph says, "Hey, we expect that you, management, to report on this and measure this in a consistent way and report every year in terms of our performance and progress. And we already reported today on these numbers. So, we're going to measure in two ways. One is what we refer to as carbon intensity. So that is really like the miles per gallon that you get in your car. You can think of it that way. It's a rate. You get so many miles per gallon in driving your car. Intensity is so many pounds of carbon dioxide admitted per megawatt hour we generate. That's what it is.

Tom Kent:

And then the second measure is the total amount of missions we have in tons. So, the total amount of missions we have. Both of those numbers are important as we think about where we've been, where we are and where we're going, because there's a lot of different levers, we can use to help assure affordability, reliability, and meet these goals. And then the fourth or last paragraph is what I call our off-ramps. And this is where the board's stating clearly that we know these issues are important. It's reliability, it's sustainability, resilience, affordability. So, what this says, is that if the board determines that at some point in the future this goal conflicts with or limits our...

PART 4 OF 6 ENDS [02:04:04]

Tom Kent:

This goal conflicts with or limits our ability to maintain our reliability goals and affordability goals. They're going to step back and take another look at our goals, and they look at our goals annually anyway, but this is just making it clear in regards to this important area that affordability, reliability, there's a balance here. That's it, fits on one page. It doesn't look like it, big print, but it fits on one page. Again, it's a discussion draft. It's a starting point. So, it's survey time again. Isn't it? Poll time.

Brad:

All right, let's do quick three quick polling questions to see where your thoughts are on this strategic directive. So, the first one is as follows in your opinion, is a net zero decarbonization goal by 2050, you can see up here, too ambitious, about right, not ambitious enough, or you have no opinion at this point.

Brad:

I think we're good. So roughly two thirds feel this is too ambitious, almost a fifth feels that's about right, about a fifth feels it's not ambitious enough. Very few have no opinion. Again, just by point of comparison, like it or not like, if you look at the IOUs across the country, there are about 50 investor-owned utilities, probably 48 would have a med zero goal at some point of some sort. 2050 overwhelmingly would be the majority of what folks would have. So, the goal as stated is not in any way out of line with what's taking place in the industry. That may not satisfy you in Nebraska, but that's just a point of fact. Second question. The goal presented is a 30-year aspirational goal. How often do you think the board... Tom talked about the off-ramps. How often do you think the board ought to make sure you evaluate it, look at trends, look at issues, and make adjustments if necessary? Within every five years, six to 10 years, or less frequently. This one's pretty straightforward. Like everybody is landed on one of these and in every setting.

Brad:

Okay. Yep. I mean, again, everybody, that's kind of an obvious, why would you not stay on top of it, review it, look at stats and make adjustments if necessary. I'm sure that's what the board and leadership will do if they land on a particular goal. The last question then is this. The information presented tonight. What do you feel you need more information on? You need to understand better the risks associated with being a carbon emitting utility. You need to understand the trade-off on those principles. We've alluded too many times. You need to understand better the discussion draft and the rationale behind it. Or you're good at this point, no further information needed. Sure. Yep.

Brad:

So, I think every setting would have had maybe a little bit a higher percentage, but I think every setting wanted some additional information on the principles of costs, reliability, and environmental impacts. Just like you did. This group has a larger, I believe, than the other settings on wanting to understand better the risks of being a carbon emitting utility. To my surprise, quite a large number. Don't need more information than that at this point. So those are the three polling questions. Again, just to kind of get a feel for what your thoughts are. Similar sorts of questions on the survey that we keep alluding to. We have a little less than an hour, but still ample time to hear back from you on your thoughts. If you have any specific questions, we welcome those. Mike, the floor is open. Please. Again, come up to a mic. So, name, city, and power provider please. That's the reason we're recording. Just so we have it.

### 3.5.2 Second Public Comments

Chuck Woodside:

So, I'm Chuck Woodside. I live here in Kearney. So NPPD is my service for my residents. Also, CEO for Cap Beth, and also is served well by Dawson Power and Southern Power. But have a question. We've talked a lot about aspirational goals, no ties to what that's going to cost. I'm curious what your projections are, as with your aspirational goals. What should we expect to pay for kilowatt hour in 2030, I guess would be my question?

Tom Kent:

So that's a very important question and a great question. At this point today, that's part of the next step for us. The next step. Brad mentioned at the beginning as we go through an integrated resource planning process where we evaluate our resource mix, get feedback from the public and our customers, and think about where we need to go for the next 20 years to meet their needs. Part of that is doing the financial analysis to talk about what the potential impacts are related to rates. That process will start later this fall.

Chuck Woodside:

Could you [inaudible 02:09:39] to guess?

Tom Kent:

Well, right now, my goal is to not negatively impact customer rates. So that's my starting point. We have to work through the issues and we do this again every few years, but again, the goal here is to balance affordability, reliability, et cetera.

Brad:

I might offer one comment on, again, not for NPPD, but just because I spend a lot of time with a lot of other utilities. You mentioned 2030. I can share with you at least a half a dozen that I'm familiar with that have probably a similar goal. They would say by 2030, the net cost impact will not be anything, because the cost of all these other technologies are coming down and are competitive. Now I can't promise that for 2050, because there are so many unknowns about how you actually get to zero, but by 2030, you're not approaching zero, you're just making progress. In almost every case, actually, every case that I'm thinking of off the top of my head would say no increase in the next five to 10 years.

Tom Kent:

That's why I said that was my goal. I think it can be done over short term.

Brad:

Yes, sir. And then ma'am, you can be second.

Chuck Peek:

My name is Chuck Peek. I'm from Kearney, and we get our power from NPPD, and appreciate all their efforts to have this program and the things they've done. Most of my power comes from [Stem Klaus's 02:11:06] solar cap out here so I appreciate that. I make my living writing and speaking, which as somebody pointed out, makes me part of the wind industry. So, I know nothing about any of what we're talking about in any form of expertise. I'm convinced that we need reliability, that that's essential for our business and farming community. I'm convinced we need balance. I really hope we keep it for a while and we don't maybe need it someday, but when my electricity goes out, my natural gas generator kicks in and that's how I'll get by.

Chuck Peek:

But here's one thing I think I do know. I think I know it pretty, certainly. The longer we kick the carbon can down the road, the more expensive it's going to be for our children and grandchildren. I don't think there's any question about that. That's not the legacy I'd like to leave them. I hope we will maintain this notion of balance and availability and reliability, but I hope we also begin to think the costs are not just what I'm paying when I pay my utility bill, the costs are larger than that, and I'm not going to pay them I'm 79 years old, but my children and grandchildren will. I think we should think about that. Thanks.

Brad:

Thank you. Yes, ma'am

J.C. Hagan:

I'm JC Hagan. I'm with Nebraska Cattlemen, Lincoln. Just a quick question. As we look towards carbon credits continuing to be an ongoing discussion, looking at your net zero goal outlined, you talked about utilizing Ag producers as a part of this offset. How do you plan to involve cattle producers in this discussion as technologies are not quite developed yet for the cow calf producer?

Brad:

Thank you.

Tom Kent:

Another great question. So, I can tell you kind of where we are today and what we're looking at. I mentioned the pilot that we're doing with a large cooperative on crops. We've also been working with some producers and we have one of our wholesale customers, one of their board members that is a hog producer, put a methane facility in several years ago. So, we've been kind of engaged in that. We've been having discussions and trying to understand and to talk about the economics around doing things like capturing methane from livestock production. So that's an ongoing discussion. It's a little bit more difficult with cattle operations than it is with other types of operations because the cattle operations are less confined, but it's an ongoing area of interest. We continue to work with EPRI and other entities that are working in that field to learn everything we can.

Brad:

Sir, do you want to making your way to the end?

Al Ventusky:

Al Ventusky, and my utility provider is South Central Public Power. I'm a pork producer and a farmer. So, this is very interesting to me. I was just at a meeting of the day and we're talking about solar panels to provide the energy for our hog operations and I think that's probably coming. But my question is, as we move to 2050, NPPD today gets its energy from many different sources. I think some of those sources are

going to go by the wayside as they're going to be proved to be inefficient as time goes on. Some of them are probably going to come to the forefront. Which ones do you think are going to come to the forefront and which ones are going to go by the wayside? Also, there hasn't been much increase in nuclear with the problems in Japan and in Chernobyl has got a rap, I think. Where are we going to go with nuclear in the future? Thank you.

Tom Kent:

It is a great question seriously, because they're tough questions. Again, much like my crystal ball when it comes to rates in 2050, my crystal ball is terms of which technologies "win" in 2050. There's a lot we probably don't know today that we're going to learn down the road. So, one of the things that we focus on as we make our plans for the future is being flexible. One of the things that we focus on is ensuring that we have a diverse resource mix. So in regards to some of the technologies that we're looking at and watching, there's lots, as I mentioned earlier, lots of different issues, not just carbon, but related to our generation resources or the industry's generation resources around clean air act, clean water act, other regulatory emissions that we continue to monitor and watch. That becomes part of the dialogue of managing risk and managing costs for our customers.

Tom Kent:

Certainly, over time technology changes. So, while we maintain our power plants very well and they run very well, they also get older with time, right? So, you have to start to look at the trade-offs between continued investment to keep those power plants reliable and running like they did on day one, which we do, with what the new technology might be. So that's an ongoing discussion over time. Certainly, one thing that's an impact is Cooper nuclear station right now has a license that expires in 2034. So, one of the things that our board will be considering over the next several years is the trade-offs of economics, operational efficiency, all sorts of things ongoing to extend that a license again, or do something else from a nuclear technology standpoint or do something else from a different technology standpoint.

Tom Kent:

So, I can have that discussion about every single resource we have. We have a wind farm south of Ainsworth, Nebraska. That's getting close to 15 years old, which in wind farm years is getting pretty old, right? So, you got to start thinking about the ongoing operating costs versus the costs of newer technology that may be more efficient or different. So those challenges we deal with all the time, that's part of the integrated resource planning process. Specific to nuclear. I'm a pro nuclear guy. Certainly, nuclear has gotten a bad rap. It's started with how nuclear was first used in the public, literally. It's had a hard time shaking that rap ever since World War II, right? Totally different ways and totally different technologies. You can't get the same accomplishment that was seen in Japan with the nuclear power plant, just can't happen physically, but still that rap is there. That's a challenge for the industry, and the industry has to deal with that. But there are certainly a lot of good peaceful uses for nuclear.

Tom Kent:

We are working and looking very hard at what new technologies look like. The biggest challenge for nuclear today is it's too expensive. Way too expensive. There's one new nuclear facility being constructed

in the United States today and its schedule and budget numbers would scare the out of you. So, until the industry figures out how to do that repeatably, consistently, on budget, on schedule, that's nuclear is biggest challenge for the future.

Brad:

Yeah. You mentioned Fukushima Japanese issue and Chernobyl. This is all public, but what Tom is referring to is Georgia powers building two units, Vogtle 3 & 4, budgeted 13 billion, current estimates 26 billion. So 2x, and multiple years over budget. The only other one that was being built was in South Carolina SCANA, and same issues over budget by billions and billions. They had to ultimately shut down the project. So that's hurting new nuclear. I will offer this. The one bright opportunity is what they call small modular reactors. SMRs, little 50 to a hundred-megawatt reactors, which TBA or Ontario power generation in Toronto and other large public entities are investing a lot of time and energy and money into believing that could be a bright future for nuclear. Presents a lot less financial and other risks. So, I'm pro nuclear too. I'm very hopeful that that materializes.

Tom Kent:

I really think there's a future there. I think small modular will prove itself over time, but it's something... Everything has trade-offs. Any of these resources we talked about tonight and we heard some of the discussion in the first hour about some of the trade-offs related to wind, as an example, right? There's no silver bullet. So, it's finding the right mix that serves Nebraskans the best.

Brad:

Yes, sir.

Shape Eaton:

Hi, Shape Eaton energy technology student at Hasting CCC, Kearney, NPPD. I'm going to ask you two questions and then you can respond to both. In reference to the article, you discussed earlier, does the method of power generation, example like wind solar nuclear, any of that, does that have any impact on the security of those reference substations. Does the generation method involving wind and solar require more investment in storage and smarter on-demand grid distribution before it can be fully relied upon? Does NPBD have any realistic plan to go fully renewable or will it maintain a balanced generation? Then the third question is-

Tom Kent:

I thought you said two.

Shape Eaton:

I know, I'm sorry.

Tom Kent:

I got to start writing down what the third one on the sport.

Brad:

It's like White house press conference here.

Shape Eaton:

Fourth question. What is NPPD doing to Nebraska jobs in the clean energy sector? Because, unlike some states, we don't have oil and coal that's readily accessible, but we do have wind and sun. How can we turn these resources into Nebraska jobs? Thank you.

Tom Kent:

Terrific questions. If I don't remember them come back up. What was the first question again? No, seriously. Oh, the substations, and whether that has to do with the generation... The issue that I was talking about is really related to cybersecurity primarily. I mean, someone could do something physically, potentially, and hurt a facility. In fact, several years ago, and this is in the public now, there was a physical attack on a substation in California where someone used a high-powered rifle to shoot holes in transformers, which is not necessarily a good thing because the oil leaks out and then the transformer doesn't cool itself and then bad things happen. What's interesting is with all the damage that they caused, no one lost any lights. So that's what I mean. I think that there's a lot more resilience out there that... Don't go out and try this, right? This I'm not, not a good thing.

Tom Kent:

So, the big issue really is around all the electronics and controls and the technology that Alan was talking about to integrate all these different things together so that you have that highly reliable system and they rely on computers and communications and those kinds of things, and that becomes the weak spot. We hear about it all the time, cyber security and all that kind of stuff. That's where a large part of the focus is. Certainly, there's focus on physical issues as well. If you're in the nuclear industry, there is a very serious focus on physical security beyond just the cybersecurity. Second question. What was it again?

Shape Eaton:

Does the generation method involving wind and solar require more investment in storage and smarter on-demand grid distribution before it can be fully relied upon?

Tom Kent:

Certainly, more storage and more cost-effective storage and large-scale storage. I'm talking more than just the battery technology we have today. Would be a real game changer. That's the big thing in our industry. The product we make has to be used as it's being made, the majority of the time. There's some storage things that happen. Certainly, some of the technology that's going on today, like using your Ford lightning pickup to power your house, they're starting to advertise that, works for a while, but there's

limits. There are storage technologies today that are in use in different parts of the country, in the world. There's something called pumped hydro, which basically gives you two different ponds and you pump back and forth to make electricity. There's battery storage. There's people that looked including us doing something called compressed air energy storage, where you store energy in the form of compressed air. One of the things that Alan mentioned that I think is a big thing for our future as an industry is hydrogen. Using hydrogen as a mechanism to store energy and then use it later in a different form. That's starting to get a lot of interest.

Tom Kent:

To solve some of the challenges of intermittent resources. Storage is the big answer, and whoever patents that, that game-changing technology, going to do okay. Did you want to add anything Alan?

Allen Dennis:

I would just say that there's a lot of research and a lot of creativity around storage. As Tom mentioned, you can't store it it's real time. One of the real creative things I heard and we heard this, you heard about the pump storage where you would release water during peak times. One fellow goes, "Well, why don't you just use concrete blocks, raise concrete blocks during low energy times, and then lower them to produce power during on peak time." People are so creative. So back to the question around what's happening around the industry, you're going to see more and more innovation, and you've seen the cost of a lot of these... I mean you look 10 years ago, 15 years ago, the price of solar has just come down dramatically. The price of wind has come down dramatically. That evolution, I think, will continue with more, but storage is something that is going to be critical on around a lot of the success of what's happening with those.

Tom Kent:

Quickly the bonus question was?

Shape Eaton:

What is NPPD doing to Nebraska jobs in the clean energy sector? Because, unlike some states, we don't have oil and coal that's readily accessible, but we do have wind and sun.

Tom Kent:

A lot of what we're doing to help create jobs in the energy sector period is, is to get into the schools and talk to kids about the fact that there's some good jobs in Nebraska. There's been a lot, even down into middle schools and high schools, right? Whether you're working for NPPD or you're working for Southern Power District or Dawson Power District, there's a lot of good jobs where people can stay right here in Nebraska. So, letting them know what the training is, what you need to do. There's jobs that span the range from someone that loves the outdoors being a line technician and climbing poles have no fear of Heights. I probably don't qualify. But others do, right? Science, technology, energy, engineering, math, promoting those kinds of things.

Tom Kent:

We work with the university of Nebraska on the Nebraska Center for Energy Sciences Research, where we work to promote energy research for undergraduate graduate students. We partner with Southeast Community College on energy technician programs or partner with Northeast Community College, online technician programs. We do that in partnership with our customers. It's not just NPPD. It's an important thing to keep kids in Nebraska, which is good for all of us.

Brad:

Other questions or comments, please.

Lisa Atchison:

My husband's sweating bullets right now, but he never knows what I'm going to say. I'm Lisa Atchison from Kearney. So NPPD. Mine's more on the emotional, when I was a little girl, we would go to New York to visit my grandparents, and before interstate 80 came through, we had to go through Gary Indiana and all those towns. I remember looking out of the window at Gary Indiana, and the sky was yellow. You couldn't see anything. People had their laundry on clotheslines and it was my first introduction to smog. Thank goodness we had some environmental protection then. Okay. I'm a mom. I'm a grandma. I'm a retired school teacher. I taught my sixth graders about energy all year long, and they learned about coal, and they learned about how natural gas is formed, and wherever you have a coal and oil, you have natural gas. I also told them that we're running out of coal.

Lisa Atchison:

We are using coal faster than our mother earth can make it because we don't understand what a million years is or a billion years is to make coal. We're digging it up faster than the earth can reuse it. Okay. This last Christmas I gave each of my grandkids, a little lump of coal, not because they're naughty, they're perfect. Okay. But I gave them the coal with the story of how coal is made and what it does and how it gives us energy, and it's a good thing. But if we use it all up, we better have plan B. We better have plan B. So, they got their little lump of coal story for Christmas. Okay.

Lisa Atchison:

Too much of anything is a bad thing. I'm diabetic, too much sugar's a bad thing for me. Too much Christmas is a bad thing. Okay. Carbon dioxide in our house is a bad thing. It kills us if we don't have an alarm there. Well, we live on a big house called the earth that has an atmosphere, which is our ceiling. If there's too much carbon dioxide on our earthly home, it's going to kill us. Okay. If it doesn't kill me, it might kill my great grandkids. So, I look at this and I've enjoyed this tonight. I'm trying to stay out of the political side, although you might be able to predict what I am, but I think that we live in this environment of fear instead of trust. As I've listened to the experts tonight, I think they have our best interests in mind.

Lisa Atchison:

Our rates haven't gone up in what? Five years. See, yeah, I took notes. They're not doing things too fast without thinking about it. They went from 20 to 45% on decrease. See, I listen, this is what my students had to do too. So, I think they're not out to hurt us. They're not out to make money off of us. They're out to provide us with the best thing for what we need now, for what we need in our future, and way down in our future. In 2050, I'll be 98. How old will you be? You won't be here, right? I don't think I will be either, but I know I'll have great grandkids that will, and I just think we need to calm down and realize that they're working for us and they're doing a good job. I thank them for it.

Brad:

Thank you, ma'am. Yes, sir. Just a quick time check. Just so everybody's aware, we have just less than 30 minutes. So just so you know, it's all yours.

Dan Sheer:

I won't take that long. Some of this is a repeat for some people, but some of the board members weren't at North Platte. Oh, I'm sorry. Dan Sheer. I'm president of Howard Greeley Rural Public Power District, in St. Paul. I know there's a lot of people in this room and also across the country that are really scared about carbon dioxide and the effects that it's going to have on our kids and our grandkids. But I've got a 90-year-old mother still lives at home by herself. She, at that age needs reliable power. She needs her air conditioning in the summer and she needs her heat in the winter. She can't withstand blackouts like we had in February. So now if we decide, or if the board would decide to close down Gerald Gentleman Power Station, we're really going to have problems covering the load. Like Tom was saying, we have to be able to cover the load.

Dan Sheer:

In a terrible cold winter, like February, my mother can't be without heat for quite a while. I know there's some of the board members would probably say, "Well, then buy her a generator." Well, she already owns a generator. It's called Gerald Gentleman, and the people of Nebraska own that generator, not the people in California, not the people in New York, not the Sierra club, not George Soros, not a lot of the people that put money into the last election. Last couple of elections that backed some of the board members. So, it's owned by Nebraskans and we got to keep it running. I'm not worried about climate change 30 years from now. I'm worried about reliability next February. That's more important to me and my 90-year-old mother.

Eric Davis:

I have a few comments. My name's Eric Davis. I'm from Kearney. NPPD customer. I just have a few comments. One. You're not going to be here in 20, 30 years. I am. I care about our future. Yeah, they're going to be here too, but you're not. Most of you are not going to be here. I'm sorry. That's the truth. Most of you will not be here in 2050. I will [be alive in 2050]. My nieces and nephews will be here. So that's my biggest issues. We need to have a diverse plan of action. This is a diverse plan of action. Just like your portfolios are diverse, NPPD needs to be diverse. One other thing, my grandpa was a dairy farmer in the Sandhills, pasture raised him. All his water came from the Ogallala Aquifer from a windmill. Those cattle never starved. They never were thirsty.

Brad:

Thank you.

PART 5 OF 6 ENDS [02:35:04]

Brad:

You can go ahead and make your way up here if you want just so you're nearby.

Dave Mirman:

I'm, I'm Dave Mirman from Glenville, Nebraska, Southern Power District and South-Central Public Power District. I've got a few personal stories to tell just to emphasize the importance of reliable energy and affordable energy. And I noticed from the surveys today that those are the most important things that we're concerned about here tonight. I was a dairy, since we brought up dairy farmers, I was a dairy farmer for decades and we are very dependent on reliable energy. We did have a diesel tractor generator, a couple of them actually for backups. So, as was mentioned before, I think the Gerald Gentleman Power Plant should be our backup, at least a big part of our backup. We don't want to shut down that plant.

Dave Mirman:

Also, I've got a disabled daughter. We've got to have a backup plan on how to take care of her in case we have more of these rolling blackouts or burnouts, whatever you want to call them. And I think those rolling blackout and burnouts were somewhat the cause of them, was somewhat because of over-reliance on the clean energy, solar and wind. For instance, down there in Texas to the South, if they wouldn't have been so reliant on those sources of power, those natural gas plants and coal plants would have been at least operating, we need that base load, and they would have had those operating to provide that base load. And they wouldn't have had the problems of frozen up coal for instance. They've been using it every day and wouldn't have the problems as serious, the problems of trying to start up because they'd been running even with the natural gas plants.

Dave Mirman:

And also on a personal note, not really a personal note, but a personable note. Those that can least afford the energy, the poor, as we saw during the last several years, we haven't had rising cost of energy because we did have the... We were using our own coal and natural gas and all of the diversification. Using all that power the last, well, the last six years at least. We did use that rather than being totally or overly reliable on the clean energy, such as solar and wind. And by the way, I'm not against solar and wind, they do have their place, but I think other than the importance for a little bit of diversification in the grid, their place is probably more for a small generation for just street signs, small, remotely located type things. So, they're useful for that. Agriculture of course, is very dependent on reliable energy and affordable energy also. It's important to this state that we concentrate, really concentrate as we have in the past on the reliable and affordable energy.

Dave Mirman:

Solar and wind right now are heavily subsidized by taxes. And again, for the poor and for everyone actually, it's important to keep our taxes as low as possible. As mentioned, the new nuclear, I don't know what the exact term is for it, but I know there is a push now for small nuclear plants rather than the larger ones that were built in the past. I think there's a good future there. I don't think ethanol's been brought up enough tonight, that is a renewable energy that I think is important, especially in the immediate future while we are still using liquid fuels.

Dave Mirman:

I think just keep common sense. Yeah, I'm just about done. I'm a politician so...

Brad:

You're good at it.

Dave Mirman:

Well, not really. But common sense just tells us that when the technology catches up, I'm thinking in the future, I'm talking about two or three decades down the line, we probably will be more reliant on possibly wind and solar. But right now, if it needs to be subsidized as much as it is, I don't think we should be overly reliant on that. I appreciate you guys listening to us tonight. I hope you do a better job of listening to the people then maybe our department of ed or our board of education is in the state and even the regions. Thank you very much.

Brad:

Thank you

Tom Kent:

Brad, just quickly here reminded me something, a comment that came from the first hour he brought up ethanol again. And so, I would be remiss to answer the question. We do burn a lot of ethanol in our transportation fleet. I don't have the numbers off the top of my head, but I can get them for you and because we have a board member that asks about it annually. So, we report on how much we burned every year to our board. So, you can burn more. I agree. It's an important part of the economy in Nebraska and it does help lower carbon emissions.

Brad:

Please.

Judy Rican:

I'm not a politician, so I'll make it quick. Something I haven't heard much about tonight... Judy Rican, Polk County Power District, they are my power supplier and I'm a board of director of two years and worked

for the district for 43 years. So, something I haven't heard anything about tonight is public power. Public power in Nebraska has a great history. I get goosebumps when I talk about it, because I know the history of it. I know what it means. I know where we've been with our good relationship with NPPD and we want to continue that. One thing I want to say is, five to seven years ago, there was a really big push to control the carbons, keep coal fire generation in Nebraska, our public power state. It's worked well for us for many years. So, there was a grass roots effort done statewide. And I believe in our district, we got about an 82% return on those surveys. And maybe it was because of our district's education, but they wanted to.

Judy Rican:

Our customers we're a small district. Our customers wanted to keep public power, excuse me, wanted to keep coal fired power plants five to seven years ago. The last I heard, we have about a 250-to-300-year disposal of coal at our readiness to use on our coal fire generation plants. With NPPDs' great work on what they have done to control the CO2 in the carbon emissions in the coal plants, has been immersive. And it showed when they show where we've come clear down in those carbon sequestrations. So, they're going in the right direction and I'm sure there's more room for improvement as technology increases.

Judy Rican:

The next thing is we need a healthy mix. I really feel we need to leave coal in our mix. I also care about the environment and I probably will be here 30 years from now. I'm not expecting to go anytime soon. So... And I do care about what is not only good for our present generation, but our future generations, my children and grandchildren. So healthy mix is the key. We've got a lot of the wind, we're getting solar. But another thing, I don't know if we've considered, there's a lot being done in the battery storage and we've talked about that tonight. Where are we going to dispose of all these batteries 15, 20, 30 years down the road? Where are we now disposing of all the wind turbine blades? Is that good for our environment? I would say not. So those are things to consider as we say we want to net zero? No, I don't believe it's good for Nebraska.

Judy Rican:

The last thing I want to talk about is the affordability and reliability that's been talked about a little bit tonight. I was on the other side of the fence. I remember when we could say Nebraska was the fourth lowest country in the nation, on our rates, then we went to the fifth. Now we're at the eighth then we'll be the 12th and the 15th and so forth. Is that what we want for Nebraskans? Is that what we want for public power? Something that I've had such a passion for throughout my life. I started in 1976. So, it's there, it's in my blood and that was one of the reasons I decided to go on the board, is because I care. So, I guess in my final say with continuing what public power has done for Nebraska, I was raised a farm girl, what it does for our agriculture, I truly believe that NPPD will work hard with their wholesale customers and continue that relationship. Listen to us, listen to the public and I know you'll take it to heart. Thank you.

Brad:

I appreciate that. Thank you. Please.

Kat Warner:

Good evening, everybody. My name is Kat Warner, I live in Plattsmouth, Nebraska and my electrical provider is NPPD. I am a senior at the University of Nebraska–Lincoln, majoring in economics and natural resource economics. I'm also one of the 10 people in this room under the age of 30. First, I would like to thank the NPPD board for making this topic of priority. I am a born and raised Nebraskan and originally from Plattsmouth, which is just outside of Omaha next to, Offutt Air Force Base. I'm here to talk about my future and how setting a carbon neutrality goal by 2040 is in the best interest of it. Yeah, 2050s, good, but the sooner the better. Setting a de-carbonization goal is common sense. By the end of 2019, there are nearly three times as many jobs in Nebraska in the clean energy generation sector as is fossil fuel generation sector.

Kat Warner:

In fact, wind technicians are the top of the list for fastest growing occupations in the United States. Right now, we are sending money, jobs and tax revenue out of state to buy coal when we could be generating homegrown Husker Energy, allowing young people like myself to stay and support a family in their local communities. Along with these clean energy companies paying local and state taxes, which can seriously help reduce the rural community property tax burden. In fact, clean energy companies pay over \$10 million already a year in property taxes. These payments give new revenue to invest in schools, emergency services and to offset property taxes. Annual local taxes paid by wind and solar projects alone could total \$2.7 billion by 2030 and lease payments to rural landowners could exceed 2.2 billion by 2030.

Kat Warner:

Climate experts and energy experts agree that fossil fuels are no longer going to be realistic or economically viable. And this is something that I'm learning about every week in my classes. I'm an economics major, I hear about this all the time. I attend economic seminars and I hear this in every single one of them, because it's such a large topic. And another thing I'm learning, is that the best form of carbon capture is we leave it in the ground. So, if we're saying... Oh, I don't want to say that. And that's why I'm here. Yeah. I wrote like a lot of stuff just... And so, yeah. But that's why I'm here. Because what's the point in sitting in a room like 150 miles away when the people sitting in this room aren't doing anything with the information I am learning and plan on spending my whole life doing.

Kat Warner:

The coal plant powered by NPPD is the largest source of air pollution at Lincoln. So, I'm literally breathing pollution as I walk to class. And another point, is that there were 206 countries that competed in the Olympics. And the fact that only one of those countries puts 15% of emissions into the atmosphere, is a lot. And China maybe the first, but we are second. Double the amount of India and triple the amount of Russia, which are third and fourth and then seven times the amount of our neighbor, Canada and 15 times the amount of Mexico. Any planner policy that does not include emission cuts at the source is completely inefficient for the future ahead of us.

Kat Warner:

Currently, NPPD runs on less than 15% renewable energy and I want to see that number rise to 100% before my midlife crisis. And yeah, this sounds hard and it's going to be. But unless we start facing this problem head on right now, we won't be able to solve this in time. Another point, reliability and affordability aren't going to be impacted by decarbonization. We've heard it a lot tonight, but I want to reiterate, that is not NPPD's job to ensure reliability. That responsibility is in the hands of the Southwest Power Pool. So, when the energy doesn't flow in Nebraska and Oklahoma or Iowa or North Dakota, it doesn't matter because of the fact it could be growing somewhere else and NPPD should not shoulder the responsibility of providing base load power to the entire Southwest Power Pool.

Kat Warner:

My gosh. Especially when the reports from the two consultants that NPPD paid thousands of dollars for, so the sticking with fossil fuel resources for the long haul would cost more money for us as repairs than clean energy and that's literally on the website. And then along with that, if you go to spp.org and scroll down just a little bit, you can watch a minute-by-minute energy generation. And if you pay attention and check throughout the day, you'll see that when wind energy is highest, cost of energy is the lowest. And that's because the market is shifting away from coal into wind.

Kat Warner:

90% of fortune 500 companies publish sustainability reports and have teams and expensive consultants telling them how to decarbonize. Yeah, I have a couple more sentences. I am here to remind our board members that you were elected to your position to learn the facts and make educated decisions. We poured our trust in you when you were elected to make the decisions that you've learned to be best through listening to experts. So please vote as if you were my age, because at one point you were and another point, I will be yours doing the same for the next generation.

Brad:

Tom?

Tom Kent:

Yeah. So, first thank you for your comments and thank you for your passion. It's good to hear from you and everyone else in the room. But I did want to clarify one thing in regards to our responsibility with respect to reliability. Any utility that's in the transmission and generation business like us, as well as regional transmission organizations are subject to national reliability standards that we have to comply with. And if we don't comply with those standards, it's a million dollars a day potential fine for each violation. So, there are certainly a lot of incentives beyond the natural, serve your customers at a high reliability, to ensure that we do our jobs in concert and in combination with the other utilities in the nation that are subject to these rules to ensure reliability. So, we are just as much responsible for the reliability of the grid as the Southwest Power Pool is.

Brad:

Sir, maybe just one or two more again. We're just about out of time.

Jerry Mattson:

My name is [Jerry Mattson 02:52:08], I live... I assume that my supplier is South Central Public Power, which by the way, I've known about them for 50 years or more. They've done an awful lot with back feeding lines and other reliability investments. And in terms of outages, probably one of the best providers in the state. So, I know Craig's here so I said that for him, but it's the truth. NPPD is the source of his power and an NPPD has been very good today. I'd like to thank Tom Kent and the rest of the NPPD people for participating in an upcoming nuclear forum, Advanced Technology Nuclear Forum, that's happening on the 21st of October down in Lincoln. Southeast Community College is part of that. There's six different vendors there. There'll be people from EPRI, there'll be people from the Nuclear Regulatory System, Commission rather and it's going to be a powerful and up to date thing.

Jerry Mattson:

I'd encourage you all to get interested in that because it could well be the answer to our carbon problems because it is zero carbon. Some of the new technologies actually use spent reactor, conventional reactor fuels, and they pelletized it in a way that prevents weaponizing it, which enhances the security of it and drives the cost down. I would say though, that we've been hearing a lot about efficiency and trying to do the right thing for the consumer and that's all well and good. But in the end, it comes down to a human decision and a lot other stuff. And what I'm talking about now, is someone somewhere made a decision on how much renewable energy to allow and to the Southwest Power Pool. Now they've got it... They've got a process that you get in the queue, you talk about how many megawatts you're going to supply and so on.

Jerry Mattson:

And so, there's a process and it costs money, but everybody that generates has got to go through that process. Is that correct? And so, what we've got now, is a blackout in February and even though we produced in Nebraska, I think it was around 107% of what we consume through that time period, it was in excess of a hundred percent. We sent it to Southwest Power Pool, someone there decided that wasn't quite enough contribution and people had to figure out how to keep their mother warm or to keep their hog shed from freezing up or to thaw out the cattle loggers. And that was an inhuman decision. Yeah, you got a machine in front of you but somebody is pushing those buttons. So, when the fall out started to happen from that blackout, the Senator Boseman had a hearing, the natural resources chair, had a hearing and asked the Southwest Power Pool to be there. And the guy, I think his name is [Lanny Nickell 02:55:37], the chief decision maker for a Southwest Power Pool. And he told everybody that throughout the 14 states, all the parts of 14 states that makes up the Southwest Power Pool, that they figure on any given day of the nameplate capacity of all the wind turbines, that they can count on 12%.

Jerry Mattson:

So, I'm going to conclude this with a request. When you're thinking about what you're going to do next, think about the unfold cost of a 12% efficient thing, and think about how much you could do with small nuclear reactors or some other zero carbon fuels. Because to put it in my own words, if I'm a cattle feeder

and I got to have a front-end loader every day to feed my cattle, if I was operating like the Southwest Power Pool, I'd have to have eight loaders sitting out there because only one of them will start on a given day. Thanks.

Tom Kent:

So, great comments. I want to just take a second and go back to the discussion from earlier because what you're talking about is the capacity value of the resources, which is a very important concept. When we in the utility industry, look at what we need to do, how we have to ensure that you reliably get energy when you want it, there's two components that we look at from a generation standpoint. There's the energy that we generate deliver that gives you the light, that runs your pumps, that makes your motors turn, that heats your house and then there's the capacity of the system, the capacity of those generating units. And so, both of those are important concepts. Capacity is really the instantaneous ability for us to respond or for a generator to respond. If someone turns on a switch or if someone starts a well, or if someone runs the steel mill in Norfolk, Nebraska, right?

Tom Kent:

That capacity value is an important part of the reliability aspects of the grid. Okay? So, from a generation standpoint, when we look at how we manage that and manage supply and demand, we're doing it with energy, but we also have to look at the capacity as we plan and we think about how we have to operate every day. And certainly, an intermittent resource like wind, there's a calculation that we go through, engineering analysis, et cetera. And on average, the capacity value for wind is in that 15 to 20% range, right? And that goes into factoring into how much capacity do we have to have available in order to ensure reliability. And so, every utility in the Southwest Power Pool that serves the load has an obligation to provide enough capacity in addition to the energy to serve their load.

Tom Kent:

Not only that, but they have to provide 12% in excess of that. And that's because on given day, something might break, something might happen, a power plant might trip off. And so, that's how that's managed to ensure reliability, that capacity requirement, guideline. And that's how things work on a normal everyday basis. So, I'm going to go back a summer into 2019, and we lost an NPPD for our customers in our peak time of the year, which is the summer, two power plants at roughly the same time. They had equipment issues. Okay? So, because we're part of that bigger pool, our capacity was unavailable because of equipment issues. We were able to rely on that pool to ensure low cost, reliable delivery of energy for our customers. That's the benefit of being part of a big interconnection.

Tom Kent:

And while in February, things got to the point where you couldn't just rely on the generation, other things had to happen to ensure that the system didn't fall apart. That's the first time in the 75-year history of the Southwest Power Pool that they had to do that. So, it's a very rare event and most years, most days it's this working together that keeps the lights on.

Brad:

Okay. I think this is our last question. So please.

Wayne Coutts:

I don't even have a question and how I feel about this is very evident. I didn't catch the name of the gentleman that was just up here, but I love you. Okay? I mean, I am general manager of Dawson Power and my name is Wayne Coutts and I appreciated your comments. Thank you. The young lady left and I wished... And I asked her to stay, but she said she could... Oh, you're back there. Come on up front. We keep hearing about our grandchildren, all right? Well, let's turn the tables. You know what, in a few years you're going to hold my future and I'd like to think you have all the tools that you have talked about and I think you're going to, and I was impressed. I mean, you're doing your homework and you're doing it right.

Wayne Coutts:

And I think the rest of us need to appreciate the younger viewpoint. We're not on the same side, you're right. But I know that you're coming up with it and you'll get there. What I'd like to do, and sadly I figured you're out of Plattsburgh, come and visit me at my office. Any of the students or whatever, let's talk and let's see each other's side because there's a lot more than just data. There's a lot more riding on all of it, but thank you.

Brad:

All right. Well, again, I'll turn it over to Tom. But for my part, thank you everybody for your passion, your comments, your input. It's very helpful. And Tom, I'll let you close things up.

Tom Kent:

Yeah. Thank you all for being here again. I know there's, there's a lot going on, right? And you took three hours out of your evening to come spend time with us to learn about what we're dealing with and provide your feedback, and it's greatly appreciated. One last plug for [www.nppd.com](http://www.nppd.com). Go fill out the survey. We certainly want to hear what you think. And I think you saw it in this session tonight, and we've seen it in all five sessions, we serve a very diverse customer base. And our goal is to find the best path forward to ensure all of our customers low cost, reliable, resilient, affordable electricity for your futures and we do that in partnership with our customers. So, thank you for being our customers and thank you for being here.

Brad:

Thank you all.

Brad:

[inaudible 03:02:30]

PART 6 OF 6 ENDS [03:03:17]

### 3.6 Customer Meeting

Speaker 1: ... Around Nebraska to get feedback. So, we will have speakers from EPRI. Tom Raddick and Alan Dennis, due to schedule conflicts, won't be able to do that. So, Michael McCray will be doing that. We will be doing live polling. Same as we did at the public forum meetings. Brad Kitchens also due to schedule conflicts, can't make it. So, Ken Curry will moderate us through the program. Tom has already shared the discussion draft, but we will have a time for feedback and comments from you on that.

In addition, this will also be recorded. So MSR, as part of this effort, will roll up all of the information we got at the public forums. They'll provide a complete transcript. Obviously, they'll provide a summary and then they'll also provide some common themes that they hear. So, this is part of that effort. Just some brief stats as we went through the state. We went to five communities, Norfolk, Seward, North Platte, Scottsbluff, and Kearney. Participation, 130 at Norfolk, 85 at Seward, 145 at North Platte, 45 at Scottsbluff and 135 at Kearney.

As of yesterday morning, MSR is providing us updates on the survey just shortly at the MPD link site. 18 wholesale municipals have responded through the separate URL, 94 wholesale, rural respondents and five retail communities. So, in my view, this has been very successful. We did get a lot of feedback, public comments. It's been very worthwhile, important and to some degrees entertaining.

Just a quick show of hands, who was all at the Norfolk session? Okay. Are you all getting enough oxygen?

In North Platte, we got a refresher course on physics and chemistry, and in Kearney, we heard about death and we also heard of a unique and creative way to make a 100 bucks. It's been very worthwhile and we've learned through this effort that our constituents and our customers are very diverse and passionate. So, with that, I'm going to hand it over to Ken. He'll walk us through, introduce our speaker and we'll get through this.

Ken: Very good. So, pretend Brad Kitchens. Brad would talk to the audience about the value of the integrated resource plan and the timeline of that. He would mention that EPRI, and Brad actually, he's an unbiased resource of the industry, very knowledgeable individual. EPRI is here to provide us balanced information and the neat thing I saw was them interjecting their professional opinion when there's some facts, and Tom jumped in on him too, on things that are just misleading.

So, the role of the moderator is to try to keep everybody on task. We would ask for public comment and then try to manage that comment the best we can from the time period perspective. So, to start with, before we introduce Michael, there is a poll we want your... Grab your cell phones. This is, we want non-NPPD people, no NPPD people put their info in here. This is customers and it's up here- it is called PollEv.com, P-O-L-L-E-V.com. Put it in your web browser and there is a code there, NPPD 999.

PollEv.com. NPPD 999. Or you can text to NPPD 999. Text that 222-333. And I'm going to look for eyeballs to make sure everybody's with me with- When you've got that PollEv thing up, look up at me.

Still see a couple eyeballs down. Hey, Dan, quit winking at me.

Okay, or if you see a neighbor needing some assistance, give them some love. How does that sound? Help them out. Everybody good? Okay, so we're going to try- we're going to do one trial and then we'll introduce our speaker real quick.

We'd like you to answer the question... And it ends up being 'Of the topics presented, which one is most, which topic you are most interested to hear about?' And just input one. And I can't see the bottom corner. Tell me when it... 19 and when we slow down.

Going to call it in about 25-ish. Okay. So, we will, 26. So we'll unveil the results. When and wait, okay. There are the results. What principles, cost, environmental, reliability, resiliency are most important to customers overall from all the other sessions? And we've got the data from in and we'll make that data available. Most all of them were there, Scottsbluff. Well, actually more Seward was higher on the second one, they were 47%. Scottsbluff was 46% on the second and 54% on the third. So, we will have that data. Our process will be Michael and I'll introduce Michael, but he'll give some information. We'll do a little more polling, then we'll transition to the- so Tom would have gotten up and talked about the strategic directive five, which we've already talked about. We can answer any questions at that time around SD five. And then there's some polling questions also around that and we want us all to go through that so we have this customer groups data to include in the details. Does that make sense to everybody? Good?

So, with that, Michael McCray, we've actually got two people from EPRI with us, Jerry Avachu, he is our account manager. He is to take care of us, thanks, Jerry. And then Michael McCray, I've known Michael for probably six years-ish. And prior to that, he was with other industry around the energy area. He is with EPRI, his role will be to hit the highlights of what we went through with the customers. He can answer any questions you all have too about that stuff too. The value again, of having EPRI at these

meetings was the unbiased knot. People would perceive NPPD had an agenda. And I know that's out there, they answered questions unbiased and did a great job. So, thank you to EPRI for doing all that, and Michael.

Michael McCray: Appreciate that, Ken. I don't know if I'll be able to answer any question that is thrown out, but I'll do my best on this. Appreciate the opportunity to come in and speak with all of you today. Just as a quick introduction, and we'll go ahead. For those of you who aren't familiar with EPRI, we, for all intents and purposes serve as kind of the research development and demonstration arm of the electric power industry. Our mission, and you'll see a lot of correlations between our mission and the mission of NPPD and other utilities is to provide, to advance innovative solutions and to make power systems more flexible, resilient, and connected to provide society with safe, reliable, affordable, and environmentally responsible electricity. And actually, this is a little bit data because we've recently updated this to actually say energy instead of electricity.

And while EPRI is, the E in EPRI is always, probably going to stand for electricity, we increasingly see the interconnections as we've discussed today, between various different sources of energy, with natural gas and water and hydrogen and other areas and all of that coming together more and more into the future. So, we've updated our mission and vision for that.

On the next side, a few key aspects and the into Ken's point in terms of being able to provide an unbiased perspective within the industry, our mission as an independent organization, while we are funded by the utilities, we do remain independent and we're organized to be a nonprofit organization that's chartered to serve for the public benefit. And that provides us the ability to be independent and unbiased in providing objective and scientifically-based facts. So, we don't advocate for anything. Basically, there's an old saying that goes 'just the facts, ma'am' and that's what we really stick to.

And we're also- a third aspect for EPRI is we're a collaborative organization. So, we are bringing together scientists, industry experts, engineers, et cetera, from across the industry to help in tackling problems as an industry, as a whole versus individual utilities, trying to tackle them themselves. Just as a quick reference point, our strategic research themes tend to obviously evolve as the industry is evolving and the most recent ones, you'll see up here. So really focusing on generation of electricity, utilizing low carbon resources, whether that's going to be anything from thermal assets and making those as clean and efficient as possible to renewable and nuclear assets as well.

Looking at end use carbon reduction. So, this could be through energy efficiency, electrification of an end-use processes, or also looking at low carbon alternative energy carriers, which is part of our low

carbon resources initiative that Tom referenced earlier. And we'll talk a little bit about that later on, I'm sure.

The third area- Oh, I think we skipped that in there. Nope, that's fine. The third area is looking at system reliability and resilience. This is a lot of what Daniel spoke about earlier in terms of, as we continue to be more and more reliant upon the electric grid, ensuring that that grid is up and running and that when we do have events that cause it to go down, we're responding quickly to those and rebuilding, rebuilding and providing service once again.

Third and fourth area is around flexibility, being able to provide the flexibility with the grid in terms of addition of DER and other types of assets, as those become more and more prevalent upon the grid. And then the fourth area, and this is exactly what we're doing here today, is educating and informing policy as well as the public and customer state and other stakeholders in terms of EPRI's research and presenting that information to have a more informed conversation.

Finally, we'll skip through this real quick. Our vision has really seen an integrated energy network. So, bringing together all of these different systems and resources. As I mentioned, not just from an electricity perspective, but also the increasing interconnection between all the various different energy commodities that are out there, but then really in the middle there, and I think if you click one more time, really focusing on the customer. Enabling them to make the best choices for them, whether it's a residential customer that's wanting to adopt, bring in DER solar panels or, electric vehicle, or if it's commercial, industrial customer, that's looking at electrifying some of their processes. Really focusing on the customer is the center of that network.

I've kind of alluded to all that, so we'll go ahead, and I didn't realize there was so many builds on this. So, the information, we're going to walk through this pretty quickly. This is what was presented at the various different forums by some of my colleagues. So, we started off with a brief history of the electric power industry. Really kind of starting from the invention of the light bulb all the way through and we can go to the next slide then to current day and talking through the entire history of the development of what we now are dealing with. And I think an important message here is that that was, so it was 1840, so we're 180 some years away from what we were at now and the amount of change that we need to make as an industry to get to where things need to be by 2050 is tremendous. So that puts in perspective what we've done over the last a couple of hundred years versus what we need to do in the next 35 to 40 years.

So again, real quick here, and most of you could probably explain this better than me. So how does electricity get to you? And clearly the idea here was, when we're talking to the general public and

putting this into layman's terms of how electricity gets from point A to point B and it gets to your house, we use a lot of the analogy around the highway system. So, you have your interstates that lead to roads, similar to transmission lines, running to distribution lines and looking at it from that perspective. So, we walked through that and we'll keep going through the presentation here. And we started, and then we kind of backed up and we looked at each aspect of that. So, we looked at the different types of generation resources that are available and gave some specific examples from NPPD portfolio and reemphasizing the needs to kind of have a diverse portfolio of assets in which you can generate electricity.

And then we came down to the next level, talked about transmission and substations. So, transmission lines are your interstates, substations are kind of your on-ramps and off-ramps onto those that lead to your local roads. Again, providing this in layman's to people so that they can understand the entire process. And then distribution lines, obviously being the local roads that you drive on to get to your house, similar type of concept here though, that stepped down to be able to provide that electricity into your home that is safe.

So, on the next piece of this is really kind of the coordination of all this. Explaining the fact that electricity cannot be cost-effectively stored and so it has to be constantly balanced. And this is a 24 hour a day, 365 days a year type of effort that is constantly going on. So, there's people who don't necessarily understand that. They don't really get the concept of like, 'why can't we do X, Y, and Z?' When it comes to adopting new technologies and other aspects, there's a lot of impacts there, and there's not much of a margin of error that we can withstand.

Again, provided in just a brief overview in terms of SPP and PVDs participation in that, so that they had an understanding as to the interconnection between other systems and the importance of that overall market.

Then the final thing, and we'll talk a little bit more about this, is bringing in NPPD's core values around our core objectives, really around being able to provide for resilient, reliable, and sustainable energy, but doing so in a cost-effective manner that helps to keep rates down. And then a final area is kind of talking through the business and regulatory aspect. The fact that utilities have an obligation to serve and bear the costs for being able to provide that service to our customers. But then they recover costs through rates that are set based upon their investments in various different types of assets and that there's a regulatory body in some way, shape or form that is reviewing those rates and helping to keep those rates low as well.

Ken: So, grab your phones. Time for a poll. Rank the following objectives on what is most important to you. So again, you're ranking them. Which one is most important to you?

Still working?

Still got a couple putting in, I believe?

We're good? Okay, show us the results. And that is consistent with all the meetings that we've had.

Pardon? Now, the data I was provided ahead, but maybe... I think Seward was, well, I don't know. Okay. Maybe, okay. And then the last, the next one, enter one word that comes to mind when you hear the word de-carbonization and what we will get are the various words and the more, the same word is utilized, the bigger it will appear in this word cloud.

And again, all different sessions will be- that information will be compiled. One word. There's a couple? Yeah, no profanity. Baloney? I don't know how to spell it, it's a big word. Are we good? Okay, everybody's in, right? We're going, going, gone. And here's the words.

Here are the words. There we go. He screamed... Nice, who put that word in? I want to- but anyway, again, there, depending on the audience, in the different venues, there were different words. So, the feedback again, and the audience has been very diverse. There's passion around all aspects of this. So, with that back to Michael.

Michael McCray: It's definitely good to see that the only four-letter words are 'high' and 'cost' up here. There was a bleep mechanism on this.

Certainly, I don't think that that is, it's probably pretty indicative in terms of most people's viewpoints around de-carbonization and that's what we want to discuss here. And I would certainly encourage, we're going to spend a lot more time on these slides than we did in the first ones, but I certainly encourage this to be very much of a discussion and so please ask questions, express your thoughts as we go through these and... Because I'm not going to be able to cover the next 30 minutes by myself, probably. So please have some discussion because we want to make this a good dialogue. So, we'll go onto the first slide here.

The energy system clearly, and we've been hearing this throughout the day is definitely through going through a transformation. And there's four key areas that we really look at in this transformation. So, the first being the energy supply, integrated systems, the community and the environment and the economy of why de-carbonization, and we'll hit on each one of these areas and probably spend a little bit more time on the economy of de-carbonization portion of this. So, we're onto the next slide for energy supply.

So, energy supply is definitely changing. Wind generation and solar generation

PART 1 OF 4 ENDS [00:21:04]

Michael McCray: Only changing. Wind generation and solar generation are becoming more cost competitive. The technologies continue to develop to the point where they're generating more electricity, you're able to operate the power's on there. And you're looking at the ability of utilities to use a regional mix of resources that's based upon the resources that are available to them. So, when you look at different regions, you're going to see different profiles as to what their mix of generation is. But this is also evolving as societal priorities continue to change. And we'll talk a little bit about those societal changes and how those are being, are pushing and changing the overall profile of the generation mix within the country and within globally. So go onto the next slide. There's not going to be a lot of shockers on this one.

So, coal has continued to go down strikingly. If you look at the last mine there on 2019, even in comparison to 2018, you see a big decrease in the amount of coal generation in the United, in the United States. And, further onto that, this is just 2019. We've already, we saw in 2020, even an additional amount of coal generation, that's coming off the line. And making up for that, and a lot of what's driving that is natural gas generation and the price around natural gas being a key driver in replacing some of that coal. But some of the others in the middle here that you see in terms of some of our traditional assets that are carbon free emitters are nuclear and hydro, have basically maintained along the same way, same levels. However, you're seeing increasingly as you read the news, you're seeing more and more talk about nuclear, having to shut down because it's not price competitive when it comes to the marketplace with renewables and with natural gas.

And then on the right side, you'll see some of the increasing areas. So obviously wind and solar continue to grow in terms of the amount of generation that we're seeing off of that. So then when you look at the 2004 profile of generation, and again, this is EIA data from 2019, you see, you have about 50% of the total generation is, is coal. And you see only a sliver of that is solar and wind. Now, when we move to

the next portion of 2019, you see that coal has dropped significantly down to 23%. Gas has increased almost 20% of the of, of, of the pie there and nuclear and hydro have maintained, but then you also see wind and hydro. And that's just in 15 years. So, imagine what this pie chart would look like 15 years from today in 2035, and how much that is going to shift and continue to change.

So then, and similar, as we look at NPPD profile, and this is looking at 2005 to 2020, and you'll see that that has kind of had a similar shift where the total carbon-free generation for NPPD was just shy of 30% in 2005, and in 2020, it was a little over 45%. So, you see again, that that path has been along the same lines in the last 15 years or so. The next area in terms of the transformation is looking at this increasingly integrated energy system. And this system is built for efficiency and reliability to help in meeting society's needs as it continues to grow. But there's growing priorities around flexibility. Security is obviously a key concern; We've seen a lot of issues in terms of cybersecurity issues that are coming across with infrastructure, we all heard about the big colonial pipeline shut down earlier this year.

There's a lot of different security concerns on there, but there's also flexibility that people want to have in terms of their selections around energy and the products that they're using that are increasingly using electricity as a source of energy. And, and then that engagement with the energy system. You have consumers who are being more proactive in terms of their energy usage, looking at opportunities for decreasing their carbon footprint or saving money, various different motivators that are, that are making them want to interact a little bit more with the energy system and not just necessarily be rate payers.

So, one of the big technological challenges that we as an industry have, and this is very familiar to those of you in the room is how do we integrate these? How do we bring these different assets online in order to allow for that adoption of new technologies by the consumer? We built a system that basically had traditionally had a one-way power flow from centralized generation down to the customer. We now have generation assets that are sitting right next to where a consumer is actually utilizing that electricity. And in some cases, is as, could it potentially even be bringing that back onto the grid as a resource for other consumers.

So how do we as an industry tackle this problem? And this requires a lot of new assets and components being added into the grid. This is adding in communication technologies. This is adding in various different sensors and bringing in data on these things, but then also leveraging analytics to be able to make sense of this, to actually control these types of systems and protect the rest of the system from being overloaded or from potentially not having enough generation in, in causing various different issues.

The third component here is around community and environment. And as a utility industry, we've always been very conscientious of the impact that our operations and assets have on the land, air and water. And that continues to be part of the conversation going forward. But more and more, we also are looking at what is the impact upon individual communities and individuals, and how can they actually leverage these new technologies and this new way through despite whatever their socioeconomic status and status is just in the same way. We've dealt with energy efficiency in the past where we've had different programs in place to be able to help those who can't afford to necessarily make those kinds of upgrades. We're going to have to continue to look at those options if we want to truly decarbonize a lot of the economy, how do we help those who don't necessarily have the means to be able to adopt these more carbon efficient type of technologies?

So, this is going to be a big part of the conversation. So, economy-wide decarbonization. And I think Tom, you alluded to this earlier in your comments, is this the conversation isn't necessarily just about how are we going to decarbonize the electricity industry, but also how is the society going to decarbonize the broader economy? And we started to pass and we had an energy efficiency with led light bulbs, smart thermostats, those types of components. That's helped us along with clean generation to be able to reduce our carbon emissions to where they are today. And you saw some of that data in Daniel's presentation earlier, but then the next component of this that's going to help them getting us to the 2030 marker, so in terms of goals for decarbonization is going to be around efficient electrification. And this is going to be things that we already know about.

We already have the technology to be able to address, and these are, this is Evs, this is electrification of forklifts and heating processes and other things within industrial areas, heat pumps for homes, different things like that. That's going to help get us to this kind of 2030 mark. But as we look at society as a whole, and we look at the entire economy, there's portions of our economy there that are simply just not going to be feasible to electrify, or they're going to be too expensive to electrify. And so, we have to start looking at what are some low carbon alternative energy carriers, such as hydrogen ammonia, bioenergy, renewable natural gas, those types of things that can help those different commercial industrial processes. Primarily you think about, you know, heavy duty transportation with cargo shipping airlines, those types of things, those are going to be harder to electrify type of applications.

And so, what do we need to do in order to be able to drive that? And that's where a lot of the research we're starting to get into is really looking at is how can we as an electric industry and the natural gas industry work together to help in coming up with these alternative energy carriers, and what is the impact then to us, and what's the opportunity to the electric power industry to be able to do this?

So, move on a little bit. So, looking at de-carbonization, there's a few different definitions around this and, and this, even when I first started hearing about this, it was like, this is a great way of thinking

about these different definitions because you see companies and countries come out and be like, we're going to be a hundred percent X by whatever. And it was like, wait a minute.

What's the difference between a hundred percent renewables and zero, what are these definitions mean? So, you'll see on the right-hand side, my right-hand side, your left-hand side here, these are the different types of assets that you have from a decarbonization perspective. So, you have your traditional, renewable assets: solar, wind, and hydro. You also have battery storage; you have storage in the form of potentially hydrogen or other thermal storage types of options. You have nuclear, you have carbon [inaudible 00:31:31] station, and then you have CO2 removal, which is, and this BCCs has bioenergy, carbon capture and sequestration. I think. So those are the different options. So, when you look at a hundred percent renewables, that's clearly is what it is. You're generating a hundred percent of electricity from renewable resources, like wind solar and hydro.

And then moving on, you have the next definition. So that one's pretty broad or pretty narrow in terms of the technologies you can utilize. And then you have carbon-free. And the good thing with carbon-free is that it brings in the component around nuclear because nuclear is a carbon-free generation source. So, you add one more piece into that portfolio of options that you have. And then you have your next definition, which is net zero. And this is what an NPPD is talking towards. That brings in a lot of other components into the equation, because you have the option of actually being able to leverage different types of technologies to either generate electricity from zero carbon resources or to somehow offset the emissions that you have from a carbon emitting types of resources. So those offsets could be planting more trees, it could be carbon capture and utilization sequence duration around that.

So obviously I think if you're following the news, you're seeing a lot of the aspects of different countries that are coming out with carbon policies and pricing and initiatives around carbon. The United States has also signed, but some signed back onto the Paris agreements in terms of cop 21. And so, you'll see that obviously this is continuing as a global push. And I think that this is obviously very important, but as we've seen with the changes between administrations this can change every four years. But I think the next slide here really gets...sorry. [inaudible 00:33:37] we'll go to the next one. Sorry. We'll go back to the other one, but this slide really gets, to me, gets to the heart of the matter because a lot of corporations are setting up goals around decarbonization and climate change.

You have 90% of the Fortune 500 companies that are publishing sustainability reports, and that's up from 20%, just 10 years ago. And the reason they're doing that is because of financial communities are pushing them to be measuring these types of risks within, within their reporting. 163 of the Fortune 500 companies have formal climate targets that they're putting forth. And a lot of your Fortune 500 companies are based in other countries, or they have multiple different types of operations. And so, they may not even, they may, when they're thinking about their carbon goals, they may not necessarily

be thinking about the carbon goals for the state that they're in, or the locale they're in, within the United States, they may be gearing those towards more towards other countries in their operations. And this piece is not going to change. This is something that is going forward and corporations are continuing to add into their policies around environment, sustainability and governance types pieces.

So that, that, that's a key. Now we can go back to the last slide, I appreciate that. And this, this is demonstrating some of the carbon prices. So, you'll see here that we have some apartment prices in terms of two regions within the United States. So, we have California as well as the Northeast with Reggie, and then we have the European union. And you'll see that clear trend in terms of the price of carbon going up. And then you'll see on the right-hand side there, what some experts are looking at in terms of the target range around that. So, if you consider the potential possibility of a national type of a market being put in place or a tax being put in place, in terms of carbon, you'll see that there's a cost in terms of having assets that generate carbon. And so that is a cost that utilities have to be able to put into consideration and eventually something that could be passed down and likely would be passed down to the end use customer.

All right. So, I think the key message here is you've seen the change from 2005 to 2020. What does the future look like in terms of NPPD? And I think the thing here is that we want to have a portfolio of options that we can think can get us to the goals for 2050. And by laying out a goal for 2050, it really allows utilities to be able to plan and start making decisions now based upon technologies that will get them to 2030 to 2040. And then what do we look like for 2050, because, there's decisions all the way along the have to be made. We can't just simply wait until we shut down a coal plant to replace it with a bunch of renewable assets. They have to be put in place, and we have to be planning for that as we go forward. So, putting forth that goal now is going to help in terms of being able to plan towards that.

So, the final aspects, I think this is a final slide, but looking at, again, going back to those common themes with resiliency, reliability, and sustainability, and how all of that affects affordability. When we saw in that last question, the priorities were resiliency and reliability, and then the cost. So, what are the trade-offs between those things? And I think we could have some good discussion in the room in terms of those trade-offs. When we look at a hundred percent renewables, the trade-offs there is going to be around reliability, if storage isn't part of that option, if we don't have really great storage technologies to truly be able to manage the variability within renewable assets, you risk reliability, and then you have the aspect in terms of a net zero. We don't know necessarily what those technologies look like to get us to 2050. There are options for carbon capture and utilization and sequence duration, but they're still in the testing mode.

We've got a few pilots running with you guys and others, but they're still in a testing mode. And they're not to a point where they're going to be economically available and be able to be widespread very quickly. And those only get us partway. So, there's a risk associated with some of these technologies. And, there's a risk associated with carbon sequestration and there's somewhat of a limited market

around the utilization of that commodity. So, there's some different options there. So how does that impact us from an affordability perspective? And, there is component of when we put up those words, expensive was number one on that, and there is an expense to doing this, but I would say that it's something that's coming along and we need to figure out how to do it in the most cost-effective way. And, utilities have traditionally been very good about being able to deploy new technologies, but continue to keep rates low. So, open the floor, I guess, any questions comments can...or Tom?

Tom: [inaudible 00:39:10].

Michael McCray: Okay. And we can skip through this slide and cover it later if we want to. I just threw this in here to talk about our vision and where we're bringing that together. So... I

Tom: [inaudible 00:39:29]

Ken: Thank you, Michael. At this point, grab your phones, we've got two more questions, then we would open it up for Q and A about anything. And we'll talk about that. So, based on what you have heard, what concerns you most about de-carbonization? Risk of doing nothing? Risk of not knowing how we will get there? Or I am not concerned.

There it is. 63%, the risk of not knowing how we will get there. So, in Scottsbluff, it was pretty even between the first one and the fourth one 15% was that the second one, North Platte, 52% was four. I'm not concerned. 34 for the middle and 14 for the top. Norfolk was pretty even third, third, third Scottsbluff was 55% at the first one 15...no, I take it back. Seward was 55% for the first one, 15 for the second 30 for the bottom one. And then Carney was 27 for the top 29 and 44.

So again, we'll have all that data for you. But, in general, again, there's differences in those that attended various meetings and opinions. So, the next question: "In your opinion has Nebraska public power district done enough to diversify their energy resource mix?" You're picking one of those.

Okay. The results are two. As you can see here. for Scott's bluff, the largest one was the top 36% followed by 23% on far behind where it should be. North Platte was 35, 33, 24 [inaudible 00:42:04]

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Ken: ... 35, 33, 24, 225. Norfolk was 14 at the top, 37 for doing more than enough but not too ambitious. Then it's, if I could read my... It's 10, 8, 24 and 6. Seward was 14 at the top 5, 33, 21, 26 and 2. And then Carney was 24, kind of even all throughout. 17% here, far behind and 24 at the top. So again, there was passion around all sides of it, and there's aspects of our customer base that have very diverse views. At this point, Brad Kitchen would say, "Are there any questions or comments from the audience?" And then I think you all have... Those that had been there witnessed that process, but are there any questions up to this point? Which would be the grounding and background information or the business risk of decarbonization that Michael covered? Mr. [inaudible 00:43:12].

### 3.6.0 Public Comments

Speaker 2: [inaudible 00:43:13].

Ken: Wait. Do we want to record this? Because this is... We're going to follow the process. Oh boy.

Speaker 2: Okay. Well, I think one thing to try and understand, and I've been trying to get this in my mind is exactly the definition of net zero. Because we talk about carbon free and then we got net zero. So, when I see the graph that shows that NPPD is 45% carbon free, would net zero be if you were 50% carbon free? Does that not mean we got 50% [crosstalk 00:43:49]-

Ken: And we would defer that to the outside expert.

Speaker 2: Okay.

Michael McCray: No. I mean, I think the idea is, is that your carbon emissions would be zero. Now to that point, you would have offset. So, if you are generating electricity from a coal power plant and you have carbon capture on it, that's capturing 100% of the carbon, then technically that is bringing that number down. So, it's not necessarily... Net zero isn't saying you're not admitting any carbon, but you're offsetting that in some way, shape or form too so that your balance, I guess, is the right word. Your balance in terms of what is being taken off out of the air versus what is actually being [crosstalk 00:44:31].

Speaker 2: You're, you're not offsetting a carbon emitting generation resource with a non-carbon emitting, right? That's not net zero.

Michael McCray: No, nope.

Speaker 2: You net it out in some other way.

Michael McCray: Yep. You're capturing that carbon before it's entering the atmosphere or you're doing something to potentially, technologies out there, or potential technology to actually remove it from the atmosphere or you're doing something offset it. Planting trees, buying renewable energy credits, doing something to offset what you're putting, what you're actually emitting.

Tom: So, here's a hypothetical. And we'll use one of our coal units. Kind of the current carbon sequestration technology is going to remove about 90%. So, let's assume that's the best when we get there and if it's economic, right? So that leaves about 10% of the emissions. You're still emitting a small amount of carbon with that resource. So, the net zero is the idea of creating offsets through some other activities, whether it's ag activities or buying carbon credits in the marketplace or planting trees to offset the effects to the atmosphere of those carbon emissions. So beneficial, yes.

Speaker 2: Okay. Let me ask you this then. So, you're working with a co-op to do some carbon reductions in their farm fields. Planting crops or what have you. We've got ethanol plants. I may be looking at sequestering their carbon into the ground. You've got electric vehicles come online. Are you going to count all of that against your carbon emitting resources to come to the net zero?

Tom: Potentially. The possibility is there. Some of it may depend ultimately on the rules that are established at some point. If we see similar regulations in terms of philosophy, as we've seen with other emission regimes, like acid rain and clean air act and those kinds of things. Part of what they do... Casper, there's the other one I was thinking of. Part of what happens in that process is a market's created to provide value to those credits or offsets. And depending on the rules that might limit ultimately, or expand ultimately, we might be able to count. But certainly, all those types of things are potential candidates, especially if we can show and verify that they're the result of the activities we're doing.

Speaker 2: Okay. Thank you.

Speaker 3: So, you could potentially plant trees to offset carbon. Is that what I'm hearing?

Michael McCray: Yeah. I mean, you could potentially plant it now. Whether or not you can plant enough trees to offset everything that's going in the atmosphere, there's probably a lot of trees. But there is the potential of being able to do some of those activities, certainly.

Speaker 3: If you could plant trees in NPPD service territory to offset it. How about planting corn?

Michael McCray: That I don't know now about. But I was reading about some of the benefits around that.

Speaker 3: I like that idea.

Michael McCray: I'm sure you do. I would definitely agree on that.

Tom: Certainly, there's a lot of discussion about ag production, right? And the thing with ag production that I think we're trying to figure out with the producers and the people like Central Valley Agriculture right now is can we show a net benefit, a net improvement in the carbon that's retained in the soil over time from the activities that are done, that's verifiable. And if we can show that, then there is an opportunity there. But in general, there's a carbon cycle. So, every year we plant a lot of corn and wheat and soybeans and all sorts of other crops in the country and they take carbon out of the atmosphere and grow things. And then through the process of us using those things, some carbon is ultimately returned to the atmosphere, but that cycle continues on an annual basis. So, the question is, and it always has. So, the question is in terms of offsets and credits, is there things that we can do that nudge that in the direction of keeping a little more carbon in the soil than what was done historically?

Michael McCray: And I think the other aspect is that is the crops that we've, to Tom's point, we've been planting those every single year and we'll still continue to do that, but the carbon emissions continue to rise. So, the question is, are there ways that we can plant more? And I think I know where you're going. How do we plant more than what we currently are in order to be able to offset that? And trees, those types of things, those are certainly option.

Speaker 3: You just said carbon emissions continue to rise, but they don't when you look at the data from 2005. We reduced carbon emissions drastically.

Michael McCray: From the power generation areas. But the idea is, is that we need to continue to decrease them so that we're not... Because of the way that, and I'm starting to get into some other stuff like technical aspects, but we need to decrease them in order to prevent the climate change that's occurring is the idea there. And I don't want to get into the debate around aspects of that, but as a utility industry, the power generation area, yes, we have continued to decline it. But globally we're declining, but we need to do it at a faster rate is one of the pieces there.

Speaker 3: Tell China.

Michael McCray: Unfortunately, I'm not talking to them.

Ken: [crosstalk 00:50:23] jump in and say, "Hey." Good discussion, maybe have a [inaudible 00:50:33].

Darren Bloomqui...: You just mentioned globally, we're declining. I've not seen any numbers on global.

Michael McCray: I'd have to go and pull those. I don't have any.

Tom: Yeah. I don't have the numbers in front of me. I think global emissions are still going up. I think that the thing from 2005 to now are not, especially over the last few years, is in with respect to our sectors emissions, the utility sectors emissions in the U.S. economy have gone down. We used to be first now we're second. But that's just one piece of the whole global equation. We're not here to solve a global equation. But we're here to understand the risks that we face as an industry when we have customers and others that are interested in change. We need to be prepared for and adapt to change. And certainly, this issue around carbon emissions is a global problem and a global issue. And ultimately, it's going to take a global solution to effect change. We're just one piece of it.

Ken: A very recent conversation with my son that lives in Africa around carbon credits in Europe where they retain and sustain forest. If they take pictures, they're looking at taking pictures of a forest area, connecting it via blockchain. So, it is legit and repeatable. They could sell those credits to Europe. That stuff's happening. Other questions? Mr. [Shear 00:52:08]. Oh, you also have to recognize who you are and who your power supplier is. But that was Darren Bloomquist before Dan Shear.

Dan Shear: I'm with Howard Greely from St. Paul. I think my numbers are right from Brad Kitchens. He said that worldwide CO2 emissions was like 36 gigatons and U.S. is five gigatons. So, I think those numbers are right. I really feel like the U.S. has done enough to decarbonize already, and look at the amount of money we were spending for all of these meetings, all of these discussions and all of the closing of coal fire plants to decarbonize while we're a small portion of worldwide. I just think we're financially hurting this country while China and Russia just continue to pump CO2 in the atmosphere.

Ken: Thank you, Dan. Any other comments or questions for this portion? If not, then the agenda would go to where Tom would describe strategic directive five. And we'll put that up there as a refresher of what Tom shared earlier. Then we will have a couple of polling questions related to it. So, keep scrolling through. Again, net zero by 2050, and then the third one had a couple off-ramps related to reliability and cost for the fourth one. Does anybody need to see that anymore again? Okay. Then the polling questions in your opinion is a net zero decarbonization goal by 2050. Too ambitious, about right, not ambitious enough, and I have no opinion.

We're good? Very good. 87% too ambitious, 13% about right. For the locations, Scottsbluff going from top to bottom was 45, 23, 32. North Platte started at 77, 14, 7 and 2. Norfolk was 52% at the top 13, 28 and 7. Seward, 30, 21 45 and 3. And Carney was 62%, 17, 17, and 3. Seward was 30 at the top 21, 45 then 3. So not ambitious enough was 45. Yeah. Okay. Yes. Next question. The goal presented is a 30-year aspirational goal. How often do you think the goal should be formally re-evaluated by the board? One to five, six to 10 or 10 plus.

And I think everybody pretty much agreed on this one. We're good? There we are. Wow. Okay. 39, 29 and 32. All of the others were for the top one. One to five years was sixth, Scotts Bluff 60, North Platte 59, Norfolk 62, Seward 64 and Carney 65. So, the feedback from those was, should look at it every one to five years. And then the last question. Of the information presented tonight, what do you feel you need more information on? And you can read those.

Very good. Okay. The core principle, utility principles, cost environmental reliability, resiliency. And that seemed to be the highest of all of them, pretty consistent, but it wasn't as strong as that, but you all come from a different perspective than the audiences. And at this time, then it would be opened up to Tom for any questions around strategic directive five.

John Dock: John Dockhorn of Burt County, Public Power District. I just had a question as far as where the net zero by 2050 came. Because if we go back and look at some of the discussion Ascend and Siemens had back in April, or whenever that timeframe was, they were leading towards 80% was

feasible, the other 20% was very high cost and low reliability. So, I was wondering where that 100% came from.

Tom: Yeah. In the case of the two studies, we basically asked them to study three scenarios. And it was fairly narrow, but it informed us somewhat on the cost. And it was consistent. In terms of the study results, it was consistent with what we've been hearing from EPRI, for example, for the past several years. Is the technology today getting to that 80% to 90% reduction range can be done? And you can manage that with affordability. It's that last 10% to 20% with the technology today, that's pretty difficult. But it's an aspirational kind of goal of the future. And it's far enough out and there's a lot of money being invested in this country and other places around the world to solve the problems of how you economically, feasibly, affordably reduce to get that last 10% to 20% to get to a net zero.

It's an aspirational goal. It sets it out there far enough in the future, gives us direction from a management standpoint of the things we need to think about and consider as we're looking at technology and affordability and our resource mix, and reliability and resilience as we go forward. Recognizing there's a lot of time between now and then, and we'll adapt and adjust as new technologies come to bear. There's probably something out there none of us have thought of today that could make a big difference. Anything you want to add from EPRI's perspective?

Michael McCray: Yeah. I just read an article that there was a big leap forward in nuclear fission. So, once we get that going, then it'll be pretty good. But no, I think, Tom's right. I mean, that it is an aspirational goal. And the idea is, is that we need be investing right now in terms of the research and the development around these technologies that can help us in reaching that small 20% chunk, which is a big portion of it. It's just that those are areas that are very hard to electrify or provide some sort of carbon-free type of option for those. We continue to look in those areas. And having, I think, the key aspect is, is by having that goal, we're widening, and especially looking at the net zero piece, you're widening the options around the portfolio. And I think there are some reasons around where 2050 is the mark, but I think that goes back to some of the cop 21 policies and other things that have been adopted. And I don't know the exact reason around the 2050 goal, but it's kind of in line with what [inaudible 01:00:44].

Tom: And for us, from a starting point, is we look around the world, the interaction, the utilities we interact with, the businesses we interact with, 2050 has been coming up a lot. Not all the time, but a lot in terms of that's kind of what people are jelling around. And I think the other piece in regards to this is like, "Okay, it's aspirational. How do you get to that last 10% to 20%?" We'll figure out over time. But don't forget if things don't change, we still have the ability to adapt and adjust. The board specifically has in this draft, the idea of off-ramps, and the idea of revisiting over time. This is a long, long-haul kind

of process that we have to work together to figure out the best way to continue to serve all the people in Nebraska we serve affordably, reliably and meet those kinds of goals.

Michael McCray: And the only other thing I would introduce there in terms of assessing where you're in a risk and exposures are, is with the current legislation that's put in place on a federal level. I mean, those goals of 2050 would be accelerated with some of that. So, there's those components to even keep in mind as you think towards these goals.

Tom: The regulations are going to drive. If when, I think it'll be when, but we'll just say, if or when those regulations are established, that will ultimately drive and potentially change what we all have to do.

Mike Lammers: So, to piggyback on that, this is Mike Lammers, Cedar Knox. To piggyback on, you touched on a, Tom, of revisiting it. And we're seeing on the survey one to five years, maybe six to 10. I would say we are going to revisit that. One part I would have is I really strongly question if we're going to do this every single year. I think that we've been working on this for two years already and we can't make decisions. To do this every year we're going to need more staff. This takes a lot of time. The other part is that if we are going to revisit it every five years, 10 years, whatever, I don't care what the time, why are we setting a goal, to me, that's unachievable if we know 10% or 20% is probably not going to get there to remain reliable and affordable? So why are we striving to go what I would call 100% net zero if we know we can't achieve that because the technology today, let's agree, it's not there to do it affordable and reliable in my opinion.

Tom: Well, I think that's a valid question and I appreciate the feedback. And that's part-

PART 3 OF 4 ENDS [01:03:04]

Tom: That's a valid question and I appreciate the feedback. And that's part of the consideration that the board needs to consider as they finalize the discussion. In terms of what that ultimately says, I'll give you my perspective as the leader of this organization. Because it's okay, in my opinion, to set visionary and aspirational goals. And know that that's exactly what they are. Because that sets that point out in the future. That is one of the many things we have to think about as we consider our resource mix, and as we consider the things we needed to do to reliably serve you over time. The IRP, the Integrated Resource Planning process, that we're going to start this fall, will be the next opportunity for us to do a deep dive in where we are today, and what we need to do to reliably serve the load we expect to see in the next 20 years or so, with the resources we have and the resources we might need in the future.

There's some big questions that we have to think about in that next horizon, okay. One is, the license for Cooper Nuclear Station currently expires in 2034. Right. So how... what does extending that license look like, in terms of cost and reliability, and all the issues we have to look at? Extending that resource is really important for us from our ability to meet whatever carbon goals we have. Because it's a carbon free base-load resource. It has costs that go with it, it has risks that go with it, and we have to evaluate that in the whole calculus.

We have the same kinds of discussions around all of our resources. We have other regulatory issues that we have in terms of compliance with emissions for all of our fossil units that ratchet down over time. And as we see those regulations changing over time, we have to, again, reassess the, what are our options to continue to comply with those regulations? How does that fit with other options that we have? And then how does that all fit together in our goal of assuring affordable, reliable, resilient power supply for our customers?

So having that visionary goal out in the future that says, "Okay, this is the policy guidance in respect to this?" from my standpoint, aids us in understanding the calculus of all the different issues that we'll have to work on. And the next resource plan is the next 20-year view of digging into that, right? And working hard with you to understand those issues and find a directionally correct path to move forward. And again, it's just a plan. It's not a: this is a hard limit, we're going to do this, this and this. Though, there could be components of it, depending on the issues. It's more of, these are the things we think provide the best value for our customers, and these are the kinds of road signs that we look for in the future to validate or adapt and adjust. And that's kind of what the Resource Plan does. That's something we do every five years. At least every five years.

So, that's the next big piece that digs into those questions more. And the board ultimately may decide that no, we don't need to provide that policy guidance to staff, right? Or they may decide that they want to change it. At the end of the day, again, from my perspective, having that policy guidance, whatever it says out there, is just another factor of the details we have to work through to address these issues to benefit our customers. That helps.

Mark Kirby: This is Mark Kirby with Butler Public Power.

Tommy, you talk about the offsets, purchasing of the offsets...

Tom: I should be able to see you real easy.

Mark Kirby: Yeah. But all... That still comes with a cost.

Tom: Sure it does.

Mark Kirby: I mean, it still comes with a cost and our rate... the rate payers are still going to end up paying for those offsets. So, have you thought... I mean, I know it's a ways away, but have you thought what those costs could be? And will there be recs in by 2050? Or is it going to be something different?

Tom: So those are great questions. And everything we do has a cost with it, we all know that, right? And so, what we have to juggle and balance is find the best mix of the costs, and the other attributes that are important, to find the best solution to serve our customers. So, it's not, "Okay, we're going to do an offset, no matter what." Is the offset economic compared to the other choices? It's usually... It's very rarely a mutually exclusive either-or kind of decision. It's an optimization decision, right? It's how you look at a bunch of different factors, bring them together to optimize the outcome that you want. So, we certainly have to think about and understand what the costs are of offsets, for your question, versus the benefits they would provide. And what that alternative looks like compared to other alternatives, and how does the combination meet our ultimate goals?

Then the second question about, "do I think there'll be any sort of credit market in 2050?" I would guess likely. I would think likely. There's... They exist today in certain parts of the country. The Northeast already has a carbon trading market. It's regionally based. I don't... If I was to guess and was to put a Coke on it, I would say, yes. So...

Mark Kirby: Okay, thank you. And while I have the mic, I have a comment about the survey, if I may?

Tom: Sure.

Mark Kirby: So, when the survey discussion came up, we were trying to figure out for our older customers, who, one, don't have a smartphone or don't have a computer. Because they need to have a voice as well. But unfortunately, we found out in the end that... Our plan was, was to have a computer in our office as an older customer wanted to come in, they could sit down, do it at the computer. But we

found out through the end that really the last person that would take that survey on that computer, that would be... that would hit the MSR group.

What else can we do for those people? I actually got an email from one of my employees yesterday, there was a couple, came in, wanted to do the survey, and we told them kind of what the situation was. And they want to know how they can have a voice. And I guess that's my question, is there anything we can do for them?

Tom: Just to set the stage a little bit, part of what we did when we set up the survey to try and ensure that we didn't... Because a lot of you asked this question, right? How are you going to ensure that you don't get the ballot box stuffed from, pick a place? And part of the reason... part of what you do to manage that, as you set controls in the survey mechanism that looks for the address of where it came from, and then it only allows one to come from that address. It's not perfect, but that was part of the reason to ensure that we could segment appropriately, and ensure that, for lack of a better word, the ballot box didn't get stuffed. Right?

So that's the downside, now you've got a couple that may not have access. They got kids? I don't know. At the end of the day, send an email to us, or write a letter to us. We're collecting that information as well. We are getting feedback via email and letters, as well. And so, if someone wants to reach out to NPPD, or our board, and provide feedback on anything, that's always a viable way of doing that.

Yup.

Dirk Dietz: Tom, how far out are you on having to make the decision on Cooper? Whether or not we relicensed it or not?

Tom: Yeah. So, can you state your name and utility affiliation?

Dirk Dietz: Oh, excuse me. Dirk Dietz with Howard Greeley.

Tom: Yeah, no problem.

Dan told me this the other day. So, what's the hurdle that we have to hit in order to ensure that we can continue to operate during the decision process?

Inaudible: The 2027 [inaudible 01:11:20].

Tom: Okay. 2027 timeframe, where we would have to be letting the NRC know our intentions.

Dirk Dietz: The reason I'm asking is because if you take... The board decides to not renew this license with Cooper, that's going to take this policy basically, and wipe it. You take 800 megs out of NPPD's generation, carbon free. There's no way to reach that net zero.

Tom: Not without other alternatives that are more economic, right?

Dirk Dietz: Yeah.

Tom: Yeah.

Dirk Dietz: Yeah. And reliable.

Tom: Yeah, and reliable. Agreed. Didn't say it was a... It's one of the things that we're going to have to figure out and discuss. And I'm not going to prejudge where that ends up. Several years ago, we went through a pretty involved process to determine whether we should do an extended power upgrade on the power station, and we decided not to. And I think that was a very good decision based on the risks that we saw at that time, and still exist today, in terms of getting power-up rates done. So those are all things that we can consider.

The good news is, is we have gone through a license renewal once, so the risk of doing that is well understood. And there're other plants of our vintage that are starting to go through their second license renewal now. So again, we will be able to be in a position to learn from the people in front of us, which lowers our risk of that decision process. But there's... we got to work through the details, understand what the alternatives are, understand what the trade-offs are in that timeframe. Does that make sense?

I should have... Those two bright shirts. They fit well together.

Inaudible: [inaudible 01:13:10].

Tom: Yeah, of course. You never made a point in any other meetings. So, we're deviating from the script right now.

Speaker 4: I just... No, there's been a lot of great comments. I think one of the... I like to be data-driven. I know all of you do, we do at NPPD. I just want to throw some numbers out for you to think about. A lot of this goes to this issue of, what will 2050 look like? Nobody in here knows what 2050 will look like in terms of the cost of resources, the mix, but we are hearing lots of things that says directionally, we need to be net zero by 2050. That's what the board policy says. And we're not an outlier graph... We're not an outlier in the industry. Our other generation peers in Nebraska doing this. Utilities who are in the generation business around the country are looking at this. So, I just want to tell you a little bit... We don't know what 2050 looks like.

I want to talk about how quickly some things have changed. And if we think back five years, and 10 years, would we have imagined this? So back in 2014, you all remember the Obama administration's Clean Power Plan. In 2014, the national mix for electricity production, from a fuel standpoint, was 85% of all of our electricity came from three sources. Coal was the leading at 40%, nuclear at 20%, and natural gas at 20... Well, make up the difference about 26%. We were 12% renewables in 2014. The Clean Power Plan scared everybody. I mean, there were a lot of folks who were really concerned about it. And it said by 2030, the nation needs to be 21% renewable, 19% other, which was nuclear, 33% gas, and 27% coal by 2030. We were concerned, could we do that as a nation? Well, where were we in 2020?

We weren't 27% coal. You saw a number 23% for 2019. By 2020 it had dropped in 19% of our nation's electricity was coming from coal. 40% from natural gas, 20% from nuclear and 20% from renewables. So, what was expected and looked unreachable in 2030, was exceeded in a number of ways. In terms of lowering CO2, even though gas exceeded what the target was, that there was a lot more reduction in coal. So, all I'm saying is, things can change significantly over time. And we're going to continue to be driven by reliability, affordability, resilience and sustainability. We need to be working closely together. But we need to look at what's the data show so far? What's it told us? We don't know all the answers going forward, but we're looking for the right answers.

Inaudible: [inaudible 01:16:58]

Tom: I'm going to, I'm going to turn it over to Courtney before we let you go. But I do want to thank you all for being here, and I really appreciate the feedback. I know many of you saw several of these sessions and I'm glad you were there to... You could experience it firsthand. We preach this all the time in our meetings with you all that diversity is really important to us. In the future, in our future, diversity will continue to be important to us. That's one of our key ways of managing risk. We have another important issue of business risks that we're trying to tackle, along with everyone else in the country. Your input in this process is very important. So, thank you for that, and thanks for participating in the meeting. I'm going to turn it over to Courtney.

Courtney: Okay. And I have wanted to echo Tom's comments. Thank you so much for coming here today. We're not NPPD without all of you. So, appreciate all the feedback, appreciate all of the collaboration, and the partnership, and wanted to just share a couple of things. First of all, we were celebrating a retirement earlier and a birthday. But also wanted to take an opportunity, we can all congratulate Matt Fritz, a new role with Niobrara Valley, and so... Congratulations. Just wanted to say really quickly, thank you to Donna Jackson, for everything that she does to make these run smoothly, and to Mike Dalton, because we couldn't do this without the two of them. So round of applause. Then lastly, we still do have an opportunity for tours of the York Operation Center. There will be NPPD vehicles here to take you over and back if you're interested, so see us for that. Oh, Donna. Yeah.

Inaudible: [inaudible 01:18:50].

Courtney: Okay. All right.

Inaudible: [inaudible 01:19:14]. [crosstalk 01:19:19]

Courtney: All right. And with that, we are adjourned.

Tom: Have a great weekend and enjoy.

PART 4 OF 4 ENDS [01:20:08]

## 4.0 Verbatims: Email Submissions

Form letter in section 4.4 was submitted multiple times from the following:

- Outside/Non-Customers - 18
- Ratepayers/End-Use Customers - 44
- Wholesale Customers - 60
- Duplicates – 8

### 4.1 Clayton Ellsworth—Public Comments

Questions and comments for NPPD meeting by a concerned NPPD Customer 8/11/21

1. What effect dose Russia having the world's largest stockpile of uranium and the dominant mine ownership have on the need for NPPD for nuclear fuel?
  2. What safeguards are going to be used for the future battery in Norfolk to prevent chemical contamination in event of damage from disasters such as fire, tornadoes and other disasters?
  3. What are the risk assessments of battery fires and chemical contamination when charging at a vehicle battery at a recharge station?
- When publishing the cost of the solar/battery projects it would be better for public relations if the anticipated cost associated with the disposal and recycling be listed.
  - The true cost of carbon emissions is nearly impossible to calculate however when stating the carbon emissions for solar projects, wind farms, and other energy projects the estimated true carbon emissions would develop a lot more trusting relationship between the public and NPPD

*CLAYTON ELLSWORTH  
1207 BEL RIDGE RD  
NORFOLK 69701  
402-699-1661*

## 4.2 Harding Email 8-12-21

### Saltzgaber, Conrad L.

**From:** Harding, Mary A. [External EMail]  
**Sent:** Thursday, August 12, 2021 1:47 PM  
**To:** Kent, Thomas J.; Modelski, Jan H.; Arlt, Timothy J.; Saltzgaber, Conrad L.  
**Cc:** Chlopek, Jerry L.; Christensen, Freddie L.; Freeland, Melissa S.; Hoyt, William C.; Johnson, William D.; Kennedy, Charles C.; Schrock, Edward J.; Thompson, Gary G.; Troester, Aaron D.; Williams, Wayne E.  
**Subject:** Re: NPPD Decarbonization Forum

This email is from mary4nppd@gmail.com. Do you know them and are you expecting this? - Look again!  
Use the "Report Phishing" button if you think this is a phishing email.  
Phishing is the #1 threat to NPPD. You are our best defense!!  
Stay Vigilant!

Dear colleagues:

This is the first written comment of this kind I have seen.

I recommend we ask management to recommend a collection point for all such written comments. Then, of course, it will be up to us to forward these.

Thank you. Also we are working harder than usual lately. I want to thank each of you for rolling up your sleeves and making yourselves available to get things done.

Best, Mary

On Thu, Aug 12, 2021, 1:16 PM Tyler Anderson <[andersty98@gmail.com](mailto:andersty98@gmail.com)> wrote:  
Good afternoon NPPD Board of Directors,

First of all, thank you for considering decarbonization and allowing the public to comment on the issue. I greatly appreciate all of the hard work you do.

My name is Tyler Anderson, and I'm a graduate accounting student at the University of Nebraska-Lincoln. I will be moving to Kearney this December to start my professional career, so NPPD will be serving me in the near future. Additionally, my fiancé already lives in Kearney.

On the heels of the 2021 IPCC Climate Change Report, it is vital we take actions to continue working towards decarbonization at all levels. I encourage you to read the report or a summary of it if you get the chance. As a public power district state, we have the unique opportunity to directly incite positive change by pushing for cleaner energy sources right here in Nebraska.

I strongly encourage you all to strive for aggressive decarbonization goals. 100% carbon neutrality by 2050 is a great goal, and the sooner, the better. Nebraska's renewable energy potential is truly massive, specifically in wind and solar. Not only is this good for the environment, it's good for the economy. The job growth and potential in the energy sector is in the renewable energy industry.

It is up to us as a society to take care of the planet we live on. Goals for decarbonization, and, more importantly, action on these goals, are the steps we need to take to begin to address the climate crisis.

Simply put, things need to change, and we have the opportunity to make it happen. Thank you.

Best regards,  
Tyler Anderson

### 4.3 Harding Email 8-15-21

**Saltzgaber, Conrad L.**

---

**From:** Harding, Mary A. [NPPD Email]  
**Sent:** Monday, August 16, 2021 7:31 AM  
**To:** BOARD List; EPC List  
**Subject:** FW: Public power letter attached  
**Attachments:** Public Power statement 8-15-21.docx  
**Categories:** Red Category

I received the attached letter this weekend via Messenger on my Facebook page.

Mr. Molczyk requested that I share it with the board.

It seems appropriate as we take up the 2022 budget process. It's my hope that we can pursue this issue more fully next year.

Best wishes, and good luck tonight in North Platte.

MAH

Sent with BlackBerry Work (www.blackberry.com)

---

**From:** "Harding, Mary A. [External EMail]" <mary4nppd@gmail.com>  
**Sent:** Aug 15, 2021 4:40 PM  
**To:** "Harding, Mary A. [NPPD Email]" <mahardl@nppd.com>  
**Subject:** Fwd: Public power letter attached

This email is from mary4nppd@gmail.com. Do you know them and are you expecting this? - Look again!  
Use the "Report Phishing" button if you think this is a phishing email.  
Phishing is the #1 threat to NPPD. You are our best defense!!  
Stay Vigilant!

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----- Forwarded message -----  
**From:** Lawrence Molczyk <lmolczyk@hamilton.net>  
**Date:** Sun, Aug 15, 2021, 11:27 AM  
**Subject:** Public power letter attached  
**To:** <Mary4nppd@gmail.com>

Just sharing my thoughts on the state of public power. I already have plans for Wednesday and probably will be unable to attend, so please share my thoughts as appropriate.

## 4.4 Harding Email 8-16-21

### Saltzgaber, Conrad L.

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**From:** Modelski, Jan H.  
**Sent:** Monday, August 16, 2021 2:16 PM  
**To:** BOARD List; EPC List  
**Subject:** FW: Reliable and Affordable Electricity Should Continue to be NPPD's Priority

**Categories:** Red Category

All, please see write-in comment below, received by Mary Harding.

Tx, J.

---

**From:** Harding, Mary A. [External Email] <mary4nppd@gmail.com>  
**Sent:** Monday, August 16, 2021 2:12 PM  
**To:** Kaiser,, Jeremy- Dawson PPD [Email] <jkaiser@dawsonpower.com>  
**Cc:** Modelski, Jan H. <jhmodel@nppd.com>  
**Subject:** Re: Reliable and Affordable Electricity Should Continue to be NPPD's Priority

This email is from [mary4nppd@gmail.com](mailto:mary4nppd@gmail.com). Do you know them and are you expecting this? - Look again!  
Use the "Report Phishing" button if you think this is a phishing email.  
Phishing is the #1 threat to NPPD. You are our best defense!!  
Stay Vigilant!

---

Thank you for your email. I will be sure this is distributed to all members of the board and management.

Best wishes,  
Mart

On Mon, Aug 16, 2021, 2:09 PM Jeremy Kaiser <[jkaiser@dawsonpower.com](mailto:jkaiser@dawsonpower.com)> wrote:

Dear Ms. Mary Harding:

As you know, NPPD is currently holding public information forums across the state in an effort to survey its customers on their opinions towards NPPD's future power generation mix and the development of carbon reduction goals. I prefer to contact you directly.

Survey after survey has shown that if asked about one's support for carbon reduction or support for "clean energy" development, the public will signal their support for such projects. After all, who would say they would support less clean energy?

As NPPD board members, you have a responsibility to understand the requirements of operating a reliable and affordable utility better than the average customer. You must act above the politics and rhetoric that surrounds this issue and make responsible decisions that ensure Nebraska's consumers and businesses continue to have access to a reliable electric supply. You have a responsibility to maintain an electric grid that values affordability and reliability more than anything else.

Shutting down Nebraska's low-cost and reliable baseload generation resources and replacing them with intermittent sources of electricity would not best serve our state. Affordability and reliability need not be compromised in order to promote a clean energy future. NPPD has proven this with its current 65 percent carbon-free generation mix.

1

The rolling blackout events of last February have clearly shown that Nebraska's diversified generation mix is necessary to a reliable electric system. We do not need to invite the problems electric utilities are seeing in California and Texas into our state. Please avoid any attempts to govern NPPD by survey results and vote against any attempts to adopt self-imposed carbon reduction goals at NPPD. Instead, please continue to focus on being a utility that produces reliable and affordable electricity in an environmentally sensitive manner.

Sincerely,  
Jeremy Kaiser  
2408 Patriot Dr  
Lexington, NE 68850-1273

## 4.5 Public Power Statement 8-15-21

**I originally wrote this as a letter to the editor almost 20 years ago. Today, I continue to advocate for the preservation of public power in Nebraska and the sentiments still hold true today. Forty-five years ago, those advocating for changes in the rate structure to benefit the average and low income user, were met with objection to the effect: "Utility rates shouldn't be used to exert social agendas." Today we face the challenge of using our public utility to achieve environmental goals. More than ever, we need a body willing to serve the needs of the people of our State. And a new social agenda is called for in decision making.**

In the mid 1970's I worked as a weatherization specialist for Lincoln Action Program. We sought out the homes of poor and elderly residents to insulate and provide more energy efficient housing. I also represented a church-based group called LOUP working to use seed money from a revolving loan fund and budget counseling measures to help some of Lincoln's poorest residents to avoid utility shutoffs in the wake of the rising costs, resultant from the emerging energy crisis we faced.

In that capacity, I was appointed to an electrical rate structure committee by then Mayor Boosalis. I and many others spent weeks reviewing the manner in which the costs for the electricity we used were apportioned amongst the range of utility customers. During this time, I became ever more convinced of the importance of public power. I also received an education about the inherent tendencies for public power officials to want to act like their private-sector counterparts in other states. We must not only work to preserve public power but we must be ever vigilant that public power remains free of the investor-oriented, expansionist tendencies of every other state around us.

At issue in apportioning costs for electricity usage, was the fact that our public power utility company charged residential users almost twice the amount per kilowatt hour as large, industrial users. Many of us wished to see a rate structure which promoted conservation and would benefit the poor. LES on the other hand contended that it was inappropriate to advance a social agenda by manipulation of the rate structure. The argument strikes at the heart of the public power debate. Had we not advanced a social agenda long ago with public power, no private concern would have found it profitable to build power lines to serve the thousands of farmers and small towns in remote areas across Nebraska. Public power means allowing us to enter into such debates. It allows us to focus the resources of the industry we all must support, into areas which best reflect our emerging interests. In Lincoln in 1975 that meant a "flatter" rate structure which allocated costs more evenly across the spectrum of users.

In our effort to preserve public power, we must take into account the fact that those people trained to run public utilities were mostly educated outside Nebraska. We are the only one of fifty states standing alone in our commitment to its citizenry. When our officials go off to negotiations with other members of the Midwest Power Pool or attend an industry conference, their contemporaries are advancing agendas which are focused on generating a better rate of return for their stock holders. At best, our officials are sheep among wolves.

In one conversation with lawmaker John DeCamp, during a radio call in program, he described to me the tendency towards increasing deregulation. He likened it to allowing the five-hundred pound gorilla to sit where it wants - nobody has much control over it.

On a more personal level, when NPPD planned to institute late fees for overdue payments, I objected to a monthly fee, which in many cases was almost as much as the entire month's consumption fee. I called members of the NPPD board and state senators who unanimously, claimed that they carried no influence in such policies. It was at this time, they informed me that de-regulation was a "done-deal". It was only "a matter of time."

Have we assumed a hands-off role with our public power utilities for so long, are our efforts to preserve public power too little too late? If public power advocates prevail, it is apparent that public power can continue to serve us well only if we maintain the reins of that power in more than name only.

Lawrence Molczyk

506 M Street

Aurora, NE 68818

402-631-9660

lmolczyk@hamilton.net

## 4.6 Schrock Email 8-09-21

### Saltzgaber, Conrad L.

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**From:** Modelski, Jan H.  
**Sent:** Tuesday, August 10, 2021 9:15 AM  
**To:** Arit, Timothy J.; Saltzgaber, Conrad L.; Cook, Christine A.  
**Cc:** Kent, Thomas J.; McClure, John C.  
**Subject:** FW: Carbon Reduction Survey

**Categories:** Red Category

This was in Ed Schrock's e-mail.

---

**From:** Mark Schanbacher <mbschanbacher@frontiernet.net>  
**Sent:** Monday, August 9, 2021 5:43 PM  
**To:** Schrock, Edward J. <ejschro@nppd.com>  
**Subject:** Carbon Reduction Survey

This email is from [mbschanbacher@frontiernet.net](mailto:mbschanbacher@frontiernet.net). Do you know them and are you expecting this? - Look again!  
Use the "Report Phishing" button if you think this is a phishing email.  
Phishing is the #1 threat to NPPD. You are our best defense!!  
Stay Vigilant!

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Mr. Schrock: I have just received a letter from the Loup Valley Rural PPD informing me of a survey, "open to the public nationwide", regarding what NPPD's carbon reduction initiatives should look like in the future. I do not understand why opinions of a non-NPPD population should have influence in our market...especially a politically charged item such as carbon emissions. It is my hope that the opinions of your customers is what you will base your decisions on, and not on outside interest groups who do not have the interest of rural Nebraskans in mind. Why is the survey open nationwide and who decision was it? Thank you for your time in responding to this e-mail.

Mark Schanbacher M.D.  
Kearney

Sent from [Mail](mailto:Mail) [go.microsoft.com] for Windows

## 4.7 Schrock Email 8-23-21

**Saltzgaber, Conrad L.**

---

**From:** Modelski, Jan H. on behalf of Schrock, Edward J.  
**Sent:** Monday, August 23, 2021 2:04 PM  
**To:** Arit, Timothy J.; Saltzgaber, Conrad L.; McClure, John C.; Kent, Thomas J.  
**Cc:** Hegert, Chris M.  
**Subject:** FW: NPPD Forums

**Categories:** Red Category

Director Schrock received the email below, and it has been faxed to him.

FYI.

Tx, J.

---

**From:** Dietz,, Dirk - Howard Greeley Rural PPD <gm@howardgreeleyppd.com>  
**Sent:** Monday, August 23, 2021 12:23 PM  
**To:** Schrock, Edward J. <ejschro@nppd.com>  
**Subject:** NPPD Forums

This email is from [gm@howardgreeleyppd.com](mailto:gm@howardgreeleyppd.com). Do you know them and are you expecting this? - Look again!  
Use the "Report Phishing" button if you think this is a phishing email.  
Phishing is the #1 threat to NPPD. You are our best defense!!  
Stay Vigilant!

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Ed,

I had the opportunity to attend 4 of the NPPD forums that were held over the past few weeks, and sat back and listened to our customers views on SD-5, and I thought that it was very evident that Reliability and Affordability are number one priorities. Howard Greeley RPPD is still concerned with the draft document of SD-5 and having a date on it. We don't like the idea of having a date set in stone, as there is not technology out there at this time to shutdown the coal baseload units and install renewable in a reliable and affordable fashion. We would hope that you would take this into consideration if the SD-5 draft comes out of committee and the Board votes on it. Thanks for the work that you have done on the Board and putting the customers first.

*Dirk Dietz*

General Manager  
Howard Greeley RPPD  
422 Howard Ave.  
Saint Paul, NE 68873  
Office: (308) 754-4457  
Cell: (308) 380-0529  
[gm@howardgreeleyppd.com](mailto:gm@howardgreeleyppd.com)

## 4.8 Scottsbluff Public Session

Scottsbluff

## NPPD Comments

- We live on a spaceship, our spaceship is earth, and we cannot leave it. Adlai Stevenson 1965 made one of the most famous speeches regarding spaceship earth.
  - We travel together, passengers on a little spaceship, dependent on its vulnerable reserves of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care, the work, and, I will say, the love we give our fragile craft. We cannot maintain it half fortunate, half miserable, half confident, half despairing, half slave—to the ancient enemies of man—half free in a liberation of resources undreamed of until this day. No craft, no crew can travel safely with such vast contradictions. On their resolution depends the survival of us all.
  - He was talking about nuclear weapons, we are talking about greenhouse gases, both of which we can and must control to save our spaceship.
- Human agriculture, transportation, manufacturing, living spaces, and other activities requiring energy based on fossil fuels are releasing CO2 raising the temperature of our spaceship and making parts of our spaceship uninhabitable. We live in a delicate balance of heat in the atmosphere. More energy in the atmosphere changes weather and eventually climate.
  - Humans cannot survive long in heat above 95 degrees wet-bulb reading.
  - Heat and insects are destroying our forest and other vegetation by fire.
  - Melting icecaps and glaciers are raising sea levels threatening millions of people.
  - Melting permafrost is releasing vast amounts of methane
  - Displaced people are moving from heat, storms, and drought.
- World problem that must be solved by all the world's people, including people in Neb.
  - Stop and reduce CO2 emissions to the atmosphere
  - Stop and reduce methane emissions
  - Nitrous oxide and ozone
  - We have wind, solar, uranium, some oil as well as natural gas and we produce a lot of food for the world.
- I addressed the NPPD Board in Kearney a few years ago when the last 5-year plan was discussed.
  - At that time, I challenged you to have more renewables and energy storage options in your next plan.
  - We will need much more electricity for transportation, heating, cooling, manufacturing, etc. Making steel using hydrogen
  - I congratulate you, we are exploring this tonight.
- The first steps in limiting fossil fuels are not terribly difficult in the total carbon free generation of electricity, the last steps are difficult, and some technologies are still being developed. There are many new technologies and new behaviors: there is no one silver bullet.
  - You will have to make carefully researched choices regarding longevity and costs.
  - In general
    - Distributed energy generation with more flexible distribution options

- Wind, solar with storage including NPPD, private for profit, and private personal
- Capacitors, Batteries for sort term energy fluctuations
- Long term storage for longer interruptions of renewable energy, from my reading, liquid air storage would be a good option now.
- Networked digital information must be developed and used to monitor a complex system and it must be secure.
- Work closely with the rural electric coops.
  - I'm 81 raised on an Iowa farm and remember the REA service being put in. It was a godsend for farm women.
  - Rural coops need to be a big part of the distributed electric system with ag members using renewables and energy storage for irrigation, livestock containment, greenhouses, etc.
- Hydrogen is coming and future planning needs to include producing hydrogen or supplying electricity to plants that produce it.
- Need to use incentives to attract people to use electricity efficiently
  - Appliances, batteries, cars, trucks, tractors, etc.
  - Communicate, communicate, communicate.
- Need to consider new molten salt nuclear plants.
  - Molten salt for cooling
  - Nuclear fuel mixed into a molten salt
  - Manufactured in a factory and shipped to an assembly site
  - Small plants.
  - Have to have a place to store waste permanently.

## 4.9 Southern Position Letter



4550 West Husker Hwy • PO Box 1687 • Grand Island, NE 68802-1687  
308-384-2350 • 800-579-3019

August 13, 2021

Board of Directors  
Nebraska Public Power District  
1414 15<sup>th</sup> Street  
PO Box 499  
Columbus, NE 68602-0499

To the NPPD Board of Directors:

NPPD is conducting a Public/Customer Outreach process to better understand your constituents' opinions regarding 1) the risks of being a carbon emitting utility; 2) how NPPD's carbon reduction goals should be structured; and 3) what principles are most important to maintain as NPPD works to reduce its carbon emissions. While the Board of Directors and management team at Southern PPD will participate in the public forums and online survey, I thought it prudent for us to provide you with Southern's position on the three areas being studied as you move forward with the development of a sustainable carbon emissions reduction strategic directive (SD-05) that will include your carbon reduction goals.

### Risks of Being a Carbon Emitting Utility

NPPD has placed great emphasis on assessing the risks of continuing to operate their fossil fuel generation resources. NPPD's Carbon Regulation Business Risk Options Analysis Team (Plan B) spent the second half of 2019 and the better part of 2020 studying the business risks associated with future carbon regulations. To gain a better understanding of the potential cost impacts, NPPD hired two consultants to provide us with studies and potential long-range impacts.

After reviewing the results of the Plan B Committee and the consultant's studies, we would ask NPPD a slightly different question. What are the risks of not being a carbon emitting utility? NPPD's current diverse mix of generation resources allow for the low-cost rates we currently receive along with the reliability that our customers deserve. From January 1, 2016, when Southern entered into the new wholesale contract with NPPD, to the end of 2020, your success in the SPP market with your current resources provided almost \$200 million in production surplus funds that were used to lower the costs to our customers. In 2021 your generation mix, primarily your fossil fuel resources, have provided \$134 million in surpluses just through July! Any premature action on your part to bow down to the demands of those wanting to eliminate the fossil fuel plants in your portfolio would be an economic disaster for wholesale rates, reduce reliability and place our customers at the mercy of intermittent generation resources along with a volatile SPP market that turned ugly last February.



Until there are regulations in place to make our current generation resources non-competitive, we believe NPPD should focus on operating and maintaining the current fleet and ignore the noise of special interest groups that have no stake in the game like we do!

How NPPD's Carbon Reduction Goals Should Be Structured

Setting a decarbonization target (carbon-free, net-zero, etc.) by the end of a certain time-frame seems premature at this time as regulations that might impact our fossil fuel plants are unknown. The targets being set by other utilities are just words on a piece of paper to satisfy special interest groups and are not in the best interest of their customers that ultimately pay the bills. NPPD should be commended for the gradual reduction in CO2 emissions, a reduction of 50% since 2005. We believe NPPD should continue to assess and move at a pace that is driven by economics and reliability without having an arbitrary decarbonization target that is both meaningless and unattainable.

What Principles are Most Important to Maintain

NPPD should continue to manage their generation resources with reliability and low-cost as their primary principles. Generation assets must be able to meet the demands of NPPD's retail and wholesale customers throughout the various seasons of the year as well as provide NPPD with marketing opportunities in SPP. Your current generation resources, primarily your baseload plants, have proven to be able to meet the demands of our customers. We don't believe additional non-carbon generation resources, other than nuclear, will be able to meet those same demands with the same level of reliability. While we are not anti-environment, carbon-free sustainability actions should only occur if costs and reliability are equal to or better than the current generation mix.

I appreciate your consideration and look forward to the results of your Public/Customer Outreach process.

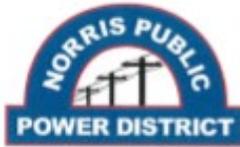
Sincerely,



Neal F. Niedfeldt  
President/CEO

CC: Tom Kent, President and CEO

## 4.10 Norris Public Power District



606 Irving Street - P.O. Box 399  
Beatrice, Nebraska 68310  
(402) 223-4038  
[www.norrisppd.com](http://www.norrisppd.com)

September 10, 2021

Re: NPPD Strategic Directive 05 – Carbon Emissions Reductions

Dear NPPD Board Members and Tom Kent, President & CEO,

It is my understanding that the NPPD Board of Directors may approve a final version of Strategic Directive 05 – Carbon Emissions Reductions soon. The latest draft that I received shows that NPPD may adopt a goal of achieving net zero carbon emissions from NPPD's generation resources by 2050. Your decision regarding the carbon emissions goal is extremely important to the citizens of rural Nebraska. The foundation and expectation of Norris residential, commercial, irrigation and industrial customers is reliable and low cost electricity.

All of us were inconveniently reminded of the importance of a reliable power system during the February 2021 weather event and associated rolling outages. Norris customers expect reliable electricity. Over the last five years, Norris customers on average were without power for less than three hours annually when large weather events were excluded from the calculation. As you know, NPPD experienced very favorable financial results during the February 2021 weather event due to its diverse and dispatchable generation resources to cover load requirements. NPPD's current generation mix has proven to be reliable and economical.

Norris customers experience very low cost electric rates as evidenced by the latest National Rural Utilities Cooperative Finance Corporation (CFC) Key Ratio Trends Analysis report that shows Norris' retail rates are in the best 5% of the nation in comparison to 814 electric distribution systems across the country. NPPD has a large influence on Norris' competitive rates since 70% of revenues collected from Norris customers are expended to cover costs of power.

Norris currently has a AA- credit rating with a stable outlook from S&P Global Ratings who have communicated to Norris that we have achieved the highest credit rating possible because of the District's relatively shallow economy based on agriculture. S&P has explained that a shallow economy means that we serve a rural area with a large portion of the population living on low incomes. Hence, the importance of providing low cost electricity.

The latest S&P Report on Norris' credit rating references the NPPD generation resources portfolio and that NPPD's heavy reliance on coal-fired generation exposes Norris to future carbon emission regulations. I support NPPD's efforts to consider the business risk of carbon emissions and being prepared for the possibility of carbon legislation or environmental regulatory initiatives. As evidenced by my previous comments on reliable and low cost electricity, it is extremely important that SD-05 does not adversely impact these foremost priorities.



The NPPD 2020 Financial Report shows that 45% of NPPD's energy supply came from carbon-free energy resources. The two consultants that NPPD recently hired to evaluate this topic stated that achieving a truly 100% carbon-free generation mix would prove to be very expensive as they looked at available and future technology options to reduce NPPD's carbon footprint. The last 10% to 20% reduction may be exponentially expensive.

Realizing that there is a difference between carbon-free emissions and net zero carbon emissions, NPPD's net zero carbon emissions goal by 2050 for generation resources is overly aggressive. While I support NPPD's efforts to investigate alternate means of electric generation, it is important to allow industries to develop and prove new technologies prior to setting a goal that is currently not realistic and without a reasonable path of attaining. Until new energy generation resources can provide power with similar capacity factors that dispatchable generation can deliver today, NPPD should take a more strategic and methodical approach to the ongoing energy transition. The leadership at NPPD should rise above the politics and rhetoric that surrounds this issue and develop flexible plans that balance reliable, low cost and sustainable generation resources.

Thank you for your consideration.

Sincerely,

Bruce Vitosh  
General Manager & CEO

