



Board Policy Strategic Directive No. BP-SD-11

Research & Development Review

THE
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PEOPLE**

NPPD Board of Directors Meeting
Strategic Business Matters
April 2025

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Director of Generation Strategies & Research



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BP-SD-11, Research & Development

“The Board encourages management to actively pursue investments in research and development in the energy industry that aligns with the District’s strategy, considering both the relative risks and possible benefits to Nebraska Public Power District customers”

NPPD Alignment with Directive

- 1. Partnership with University of Nebraska-Lincoln (UNL) for the Nebraska Center for Energy Sciences Research (NCESR)**
 - Cycle 20 Requests for Proposals, Summer interns' program, Letters of Support, Energy Center Chronicles, Biochar Hub
- 2. Membership with Electric Power Research Institute (EPRI)**
 - Full Membership, Nuclear, Low Carbon Resource Initiatives (LCRI), Self-directed and Supplemental R&D (Long Duration Energy Storage, Reciprocating Internal Combustion Engine (RICE)), Linear Generators, Carbon Capture, Gas Turbines, Open Power AI Consortium, DCFlex
- 3. Generation Strategies & Research Projects**
 - Universities, Engineering Firms, National Labs, Energy & Environmental Research Center (EERC), U.S. Department of Energy (DOE), State of Nebraska, Various Industry Groups

NPPD Alignment with Directive

R&D Funding

- Funding for energy-related research was envisioned with the establishment of NPPD's Domestic Energy Research and Application Initiative in 2005
- These research efforts were championed by then Director Darrell Nelson with broad board & NPPD management support
 - ✓ \$1.5 million annually for the UNL based Nebraska Center for Energy Science Research
 - ✓ \$500,000 annually for internal NPPD Research & Development (R&D) type projects – over time, funding for these types of projects became known as “Dostal Dollars”

NPPD Alignment with Directive

Current Generation Strategies & Research Project Activities:

- ✓ 39+ NDAs signed over last couple of years
- ✓ FEED (Front-End Engineering & Design) Study for Carbon Capture & Sequestration (CCS) utilizing chilled ammonia
- ✓ Ethanol to other products, i.e. SAF**, methanol, renewable diesel, hydrogen, etc.
- ✓ Linear generators utilizing renewable fuels
- ✓ Small Modular Reactor (SMR) Siting studies
- ✓ Long Duration Energy Storage pilots – non-battery > 10 hour duration

**Sustainable Aviation Fuel

NPPD Alignment with Directive

Current Project Activities (Cont'd):

- ✓ Monolith – water, steam, ammonia
- ✓ Hydrogen – blend with natural gas and stand-alone fuel for gas turbines / power generation
- ✓ Carbon Sequestration, Terrestrial Sequestration, Carbon Credits, Carbon Offsets, Biochar
- ✓ Alternate Fuels / Chemicals – Methanol, Ammonia, Dimethyl Ether, Renewable Diesel, Urea
- ✓ Renewable Natural Gas
- ✓ Gasification, Pyrolysis, Torrefaction, Autothermal pyrolysis (ATR)

NPPD Alignment with Directive

Industry Touch Point / Contacts / Working Groups

FCHEA – Fuel Cell & Hydrogen Energy Association

PCOR – Plains CO₂ Reduction

PCOC – Plains CO₂ Capture

CH4 Connections – Methane

CURC – Carbon Utilization Research Council

RFN – Renewable Fuels Nebraska

CHS – Center for Hydrogen Safety

AEA – Ammonia Energy Association

MI – Methanol Institute

HCN – Hydrogen Cyanide

ACE – American Coalition for Ethanol

NEB – Nebraska Ethanol Board

USBI – United States Biochar Initiative

IBI – International Biochar Initiative

LCRI – Low Carbon Resource Initiative

NPPD Alignment with Directive

Current DOE / USDA Project Activities:

- **DE-FOA-0003473** – Carbon Capture Demonstration Projects – CO₂ Capture at GGS Unit 2 – *Concept paper submitted 3/1/25*
 - ✓ DOE removed - no additional information available at this time
- **DE-FE0031993** – 21st Flexible Gasification of Coal and Biomass to Generate Electric Power and Carbon Free-Hydrogen Co-Product - *Awarded – full FEED phase in progress*
- **DE-FOA-0003485** – Generation III+ Small Modular Reactor Early Site Permit – *Application issued 1/17/25*
 - ✓ Reissued by DOE with new April 23, 2025 due date



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Questions

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