

Minutes of the  
**EMPOWER NORTH DAKOTA COMMISSION**

May 11, 2016  
EERC  
15 N 23<sup>rd</sup> Street, Grand Forks ND

**Members present:**

Al Anderson, Mark Nisbet, Jay Skabo, John Weeda, Jason Bohrer, Terry Goerger, Dale Niezwaag, David Straley, Ron Ness, Mark Nisbet

**Ex Officio Members:**

Sandi Tabor, Julie Voeck, Margaret Hodnik, Mark Bring

**Others present:**

See [Appendix A](#) for additional public

**CALL TO ORDER/WELCOME**

Chairman Anderson called the meeting to order at 10:00 am and welcomed Commission members and guests.

**APPROVAL OF MINUTES**

It was moved by Weeda and seconded by Niezwaag to approve the minutes of April 12, 2016. Motion carried unanimously.

**BNSF – Plans, Projects & Issues**

John Olson, Attorney at Law, presented information [Appendix B](#) discussing capital and project investments that Burlington Northern Santa Fe (BNSF) is conducting regionally and nationally. Investments include; major line and terminal expansion, bridge maintenance, maintaining network infrastructure addition of double track and upgrading to a centralized traffic control (CTC) signal system to improve train movements between Bismarck and Fargo.

By the end of this year, BNSF will have invested \$1 billion in North Dakota over a four-year period (2013-2016) through its capital spending program.

**New Energy Degree Program at UND**

Dr. Michael Mann, Executive Director, Institute for Energy Studies, UND, presented information [Appendix C](#) about the energy education program at the Institute for Energy Studies at UND. He gave background information about the program, motivation for, attributes of, and technical and non-technical course topics under consideration.

Dr. Mann mentioned a need to form an external advisory group for the program and welcomed the EmPower ND commission members to join.

**Spotlight on North Dakota Energy**

Emily Cash, Director, Great Plains Energy Corridor, presented the 2015 edition of the Great Plains Energy Corridor's *Spotlight on North Dakota Energy*, [Spotlight on North Dakota Energy](#)

The Energy Corridor worked closely with the EmPower ND Commission to compile and report highlights from the energy sectors. Updates and additions to this year's document include expanding the document by four pages, adding the EmPower ND logo, adding an energy site map, adding the Petroleum Marketing section and adding a diagram in the Recovered Energy section.

Copies will be sent by mail to the EmPower ND members and will be available to the many others, including public and teachers.

**EmPower ND Commission Process**

The Commission discussed the process of how to bring draft legislation forward. It was questioned by Commission member, Dale Niezwaag and discussed amongst members.

A consensus decision was made to adopt three options for a bill to be brought forward: (1) run the bill under the ED&T committee's authority, (2) have the bill come direct from Governor, and (3) have industry gather sponsors and run the bill individually.

The EmPower ND Commission will be meeting this afternoon for a joint meeting with the Energy Development and Transmission (ED&T) Committee to discuss the process. Niezwaag will present the process to the committee at that time.

**Review of Subcommittee Reports**

Subcommittee chairs discussed their talking points for presentation to the ED&T Committee later in the day. Reports consisted of priority in four areas: (1) sales and use tax exemption for wind energy facilities to be made permanent, (2) providing incentives to capture CO2 for use in enhanced oil recovery, (3) provide funding for basic research, (4) provide funding for advanced research.

**Public Comment**

Chris Kunkle, Wind on the Wires, discussed the importance of the EmPower Commission to retain the Sales and Use Tax Exemption for wind energy facilities.

### Future Meetings

It was discussed to have less speakers and set aside more time for industry discussion. Chairman Anderson mentioned he will contact the Governor's office in securing future attendance to EmPower ND Commission meetings.

The next meeting will be at the Northern Great Plains Research Laboratory in Mandan on June 6<sup>th</sup> and tentatively the 7<sup>th</sup>.

### ADJOURNMENT

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Al Anderson Chairman	Date
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Sherri Frieze Recording Secretary	Date
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### JOINT MEETING OF THE EMPOWER NORTH DAKOTA COMMISSION ENERGY DEVELOPMENT & TRANSMISSION COMMITTEE

May 11, 2016

EERC

15 N 23<sup>rd</sup> Street, Grand Forks ND

Senator Rich Wardner, Chairman of the ED&T Committee, called the meeting to order at 2:00 pm as a joint meeting with the EmPower ND Commission.

Al Anderson, Chairman of the EmPower ND Commission, highlighted topics that would be addressed to the ED&T Committee during the day and also spoke about the *Spotlight on North Dakota Energy* document, [Spotlight on North Dakota Energy](#)

### EmPower ND Process

Dale Niezwaag spoke to the ED&T committee about the EmPower ND process for bringing draft legislation forward: (1) run the bill under the ED&T committee's authority, (2) have the bill come direct from the Governor, and (3) have industry gather sponsors and run the bill individually.

Chairman Wardner thanked the EmPower ND Commission for their hard work and transparency with the committee.

### Easement and Siting Process Issues

Bob Grant, Board of Directors, Mountrail – Williams Electric Cooperative, and Northwest Landowners, spoke to the EmPower ND Commission and the ED&T Committee about lack of communication amongst landowners on the siting and easement process. He commented that the landowner is not contacted until the project is permitted, giving the landowner little time for comment.

Grant commented there needs to be local input first. Discussion ensued amongst the ED&T Committee stating that easement issues seem to be carrying over past the edge of the landowner's property and a conclusion needs to come first with less opposition to development.

### Infrastructure Subcommittee

Ron Ness, Chair, Infrastructure Subcommittee, spoke about funding consideration to address critical infrastructure needs: (1) funding mechanisms that allow communities leverage and financial support for critical community infrastructure, (2) easements/rights of way – landowner concerns, (3) clarify jurisdictional authority. [Appendix D](#)

### Research & Development Subcommittee

John Weeda, Co-Chair, R&D Subcommittee, spoke about funding support for basic research and advanced technology through ND research institutions and continued support for the ND Health Department with the resources they need for maintaining state primacy.

[Appendix E](#)

Wade Boeshans, Co-Chair, R&D Subcommittee, spoke about the preservation of CO<sub>2</sub>, increased load growth and/or challenges with economic dispatch to some ND power plants, and fighting the EPA battle with help from congressional delegation.

Boeshans then discussed the Allam Cycle, that uses pressurized CO<sub>2</sub> rather than steam to generate power at a lower cost and more efficiently. Currently, \$11 million of research dollars have been funded from Industry partners, State of ND, and the U.S. Department of Energy.

[Appendix F](#)

### Regulatory Subcommittee

Jason Bohrer, Chair, Regulatory Subcommittee, spoke about 2 issues: (1) expiration of the sales and use tax exemption for wind energy facilities, (2) new production and/or extraction tax exemption for enhanced oil recovery utilizing carbon dioxide captured from North Dakota coal plants. The incentive would be capped by tons of CO<sub>2</sub> utilized, i.e., 15 million tons of CO<sub>2</sub> capped, would meet Clean Power Plan requirements. [Appendix G](#)

There being no further business, Chairman Wardner adjourned the meeting at 3:45 pm.



**REGISTRATION OF MEETING ATTENDANCE**  
SFN 10974 (3/01)

NAME OF MEETING

EmPower ND Commission Meeting

PLACE

EEERC, Grand Forks

DATE

May 11, 2016

YOUR NAME	AGENCY	E-MAIL ADDRESS
Julie Vocek	Next ERA Energy	julie.vocek@nee.com
CHRIS KUNKLE	WIND ON THE WIRES	ckunkle@windonthewires.org
Emily Cash	BSC	emily.cash@bismarckstate.edu
David Straley	NACal	
John Olson	ENEF	
Matt Hill	ALLETE/MN Power	mhodrik@mnpower.com
Wade Boeshans	BWI Energy	wboeshans@BWI Energy.com
Jess	NDRC	
Leon Bohrer	LEC	
Karlene Fine	Industrial Commission	kfine@nd.gov
Danette Welsh	ONEOK	dwelsh@oneok.com
Scott Johnson	UN D	scott.t.johnson@enr.unl.edu
Justin Dever	Commerce	jdever@nd.gov
Bob Grant	NDAREC	
Jean Schaffer	Basin Electric	jean@bepo.com
Shane Goettle	Odne	sgoettle@odney.com
Chris Zygarkich	UN D EERC	czygarlicka@undeeerc.org

### ATTENDANCE SHEET

Date: 5-11-16 Committee: Energy Development & Transmission

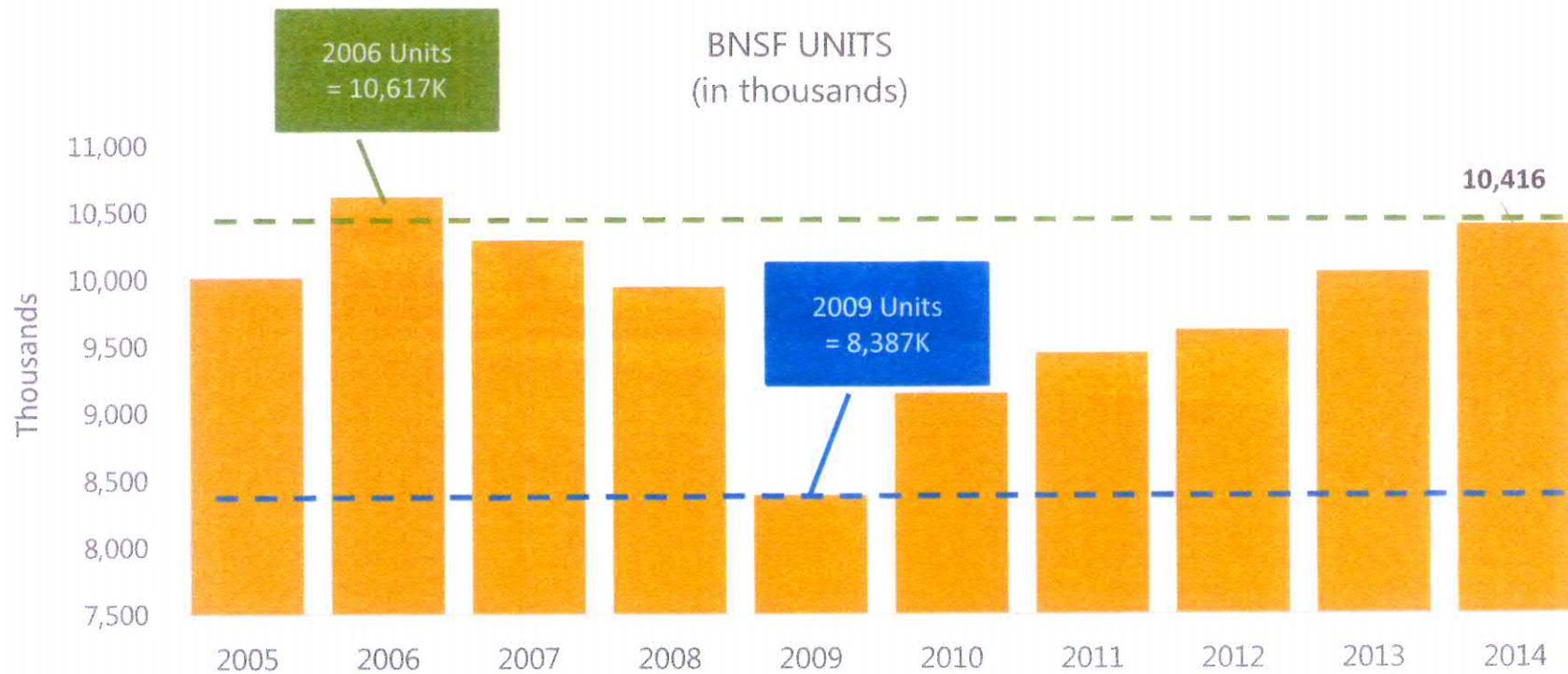
PLEASE PRINT

Name	Organization/City	E-mail Address
JAY SKARBO	MDU / BISMARCK	
Karlene Fine	Industrial Commission / Bismarck	kcfine@nd.gov
Bob Grant	NDAREC / NWLA	
Chris Zygarke	FERC	czygarke@undeeerc.org
Jean Schaefer	Basin Electric	jean.schaefer@be.com
Don Hugi	EERC	
Charlie Gorecki	EERC	
Jim Sorensen	EERC	
Zac Weis	Marathon Oil	zac.weis@marathonoil.com



***BNSF***<sup>®</sup>  
*RAILWAY*

# 2005-2014 BNSF Volumes

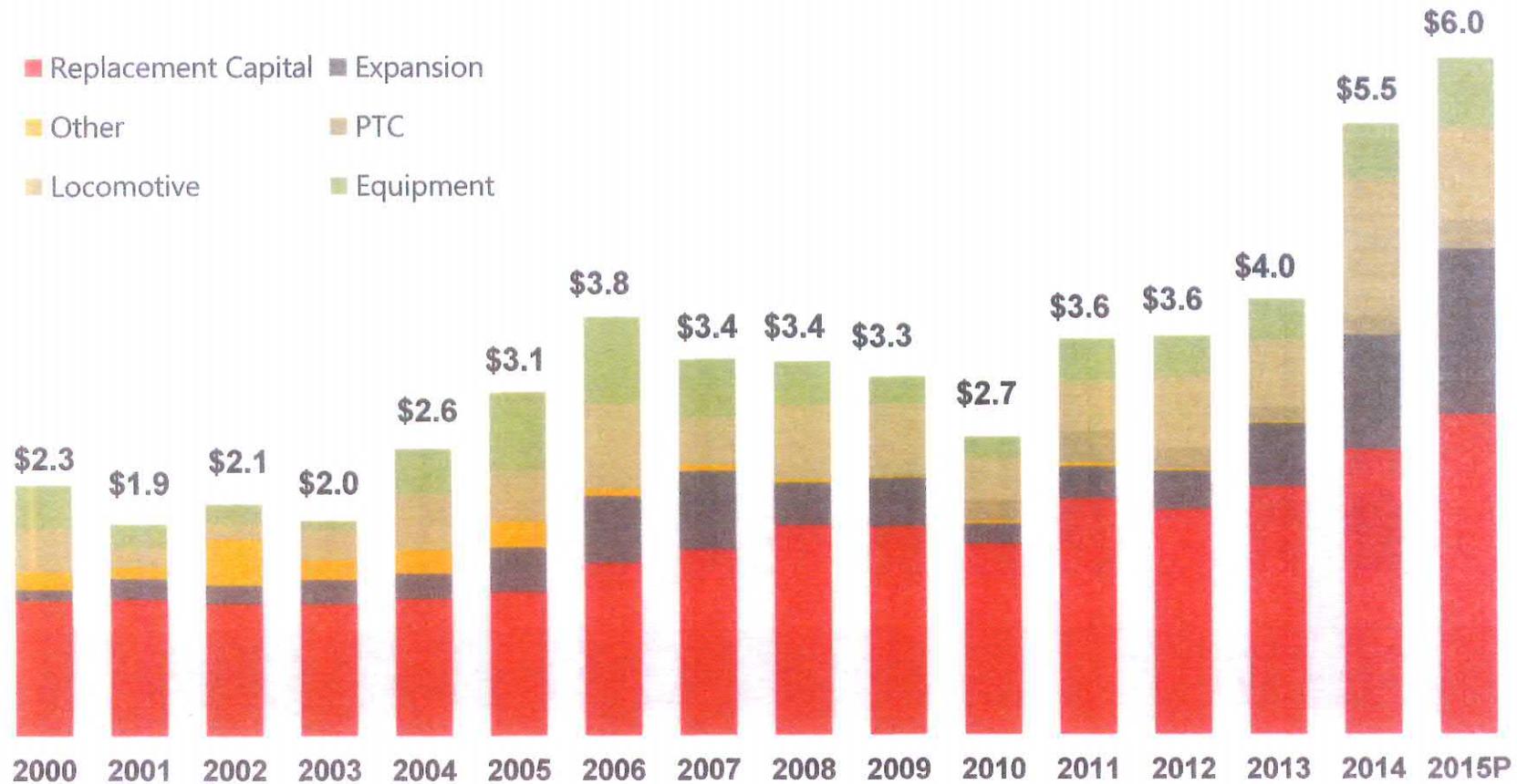


Source: Association of American Railroads (AAR) data

# BNSF Aggressively Deploying Capital to Meet Service Expectations

BNSF CAPITAL INVESTMENT OF \$53B FROM 2000 - 2015

\$ Billions



# BNSF'S 2014 \$5 BILLION CAPITAL PLAN

## MAJOR LINE & TERMINAL PROJECTS BY REGION, ROUTE AND SUBDIVISION (SUB)

### North Region

- 1 **Bellingham Sub:** two staging tracks, one power switch at Anacortes
- 2 **Devils Lake Sub:** three siding projects
- 3 **Dickinson Sub:** four siding tracks
- 4 **Fallbridge Sub:** two siding projects
- 5 **Forsyth Sub:** six siding projects
- 6 **Glasgow Sub:** six double-track projects
- 7 **Hillsboro Sub:** four siding projects
- 8 **Jamestown Sub:** one siding project plus CTC (centralized track control) across subdivision
- 9 **Lakeside Sub:** five double-track projects and one siding project
- 10 **Zap Sub:** one siding project
- 11 **Noyes Sub:** interchange tracks and siding project at Emerson

### Central Region

- 12 **Hannibal Sub:** one siding project
- 13 **River Sub:** one double-track and one siding project
- 14 **Sioux City Sub:** one bypass track and one siding project
- 15 **Barstow Sub:** one siding project

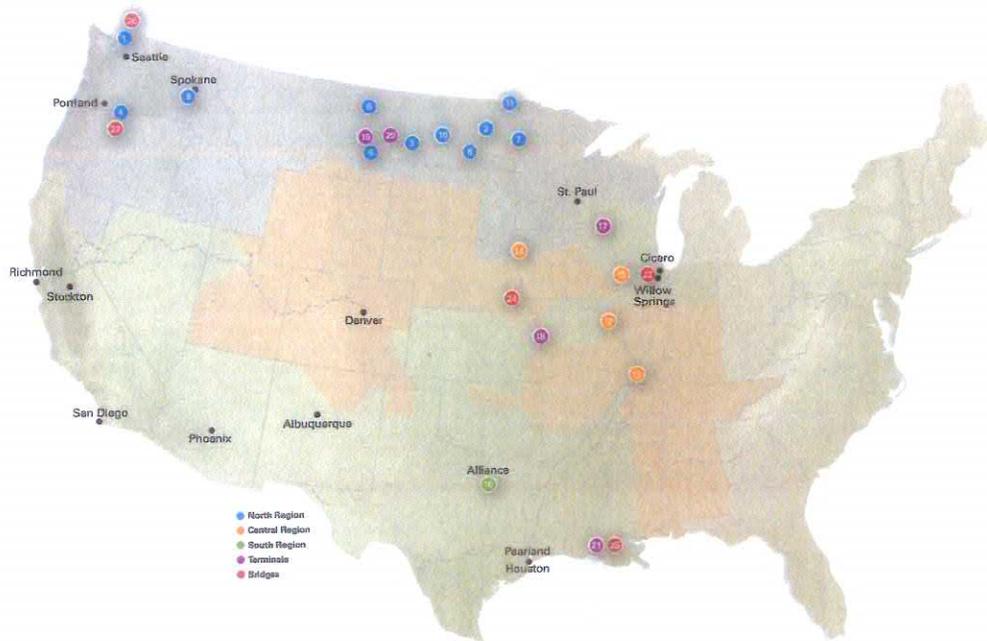
### South Region

- 16 **Fort Worth Sub:** completion of the multi-year Tower 55 project

### Terminals

- 17 **La Crosse, WI:** continue double tracking and signaling improvements through terminal (project started in 2013)
- 18 **Argentine Yard at Kansas City, KS:** reconfigure portion of yard to accommodate more automotive car switching and increase overall terminal throughput
- 19 **Forsyth, MT:** extend track lengths at terminal
- 20 **Glendive, MT:** extend track lengths at terminal
- 21 **Lafayette Sub:** continue construction of new terminal to serve customers in the Lake Charles, LA, area

BNSF HAS INVESTED \$42 BILLION IN CAPITAL INVESTMENTS SINCE 2000.



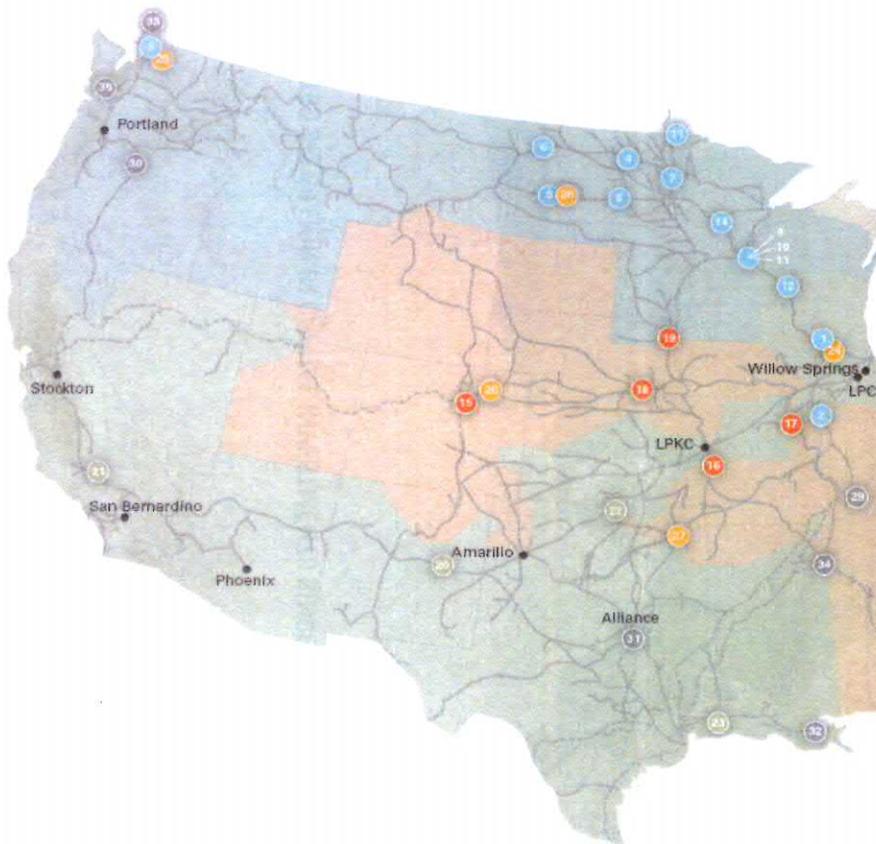
### Bridges

Construction work is underway on some of the largest bridges in the BNSF network, including:

- 22 Fallbridge Sub:** Bridge 24.8 over Washougal River in Camas, WA; replacement of river bridge will take more than two years to complete due to the permitting and right-of-way constraints
- 23 Mendota Sub:** Bridges 106.58 and 110.26 near Princeton, IL; replacement of both double-track bridges is being combined as one project
- 24 St. Joe Sub:** Bridge 160.76 in Tecumseh, NE; replace bridge across North Fork of the Nemaha River
- 25 Lafayette Sub:** Bridge 32.06 in Des Allemands, LA; major work to the moveable bridge that crosses Bayou Des Allemands
- 26 New Westminster Sub:** Bridge 129.3 near Colebrook, BC; continue work from 2013 on bridge over Serpentine River

These are the BNSF capital projects at press time; changes may be made to the projects throughout the year.

# BNSF's 2015 \$6 Billion Capital Plan



## Terminal & Line Capacity Expansion Projects

Major line and terminal projects by region, route and subdivision (sub)

### North Region

- 1 **Aurora sub:** CTC signaling project with crossover plants, plus begin construction on two more double-track segments
- 2 **Bearistown sub:** five siding extensions plus CTC signaling on the north end of the subdivision
- 3 **Bellingham sub:** one double-track project
- 4 **Devils Lake sub:** CTC signaling on subdivision
- 5 **Dickinson sub:** one siding extension
- 6 **Glasgow sub:** complete three double-track projects started in 2014, and begin one additional double-track project
- 7 **Hillsboro sub:** CTC signaling on subdivision and connection upgrade
- 8 **Jamestown sub:** completing CTC signaling project started in 2014
- 9 **Midway sub:** one double-track project
- 10 **Monticello sub:** subdivision connection and track upgrades
- 11 **Noyes sub:** one new siding
- 12 **St. Croix sub:** CTC signaling project with crossover plants
- 13 **St. Paul sub:** one triple-track project
- 14 **Staples sub:** one CTC signaling project and three double-track projects

### Central Region

- 15 **Brush sub:** six siding extensions
- 16 **Ft. Scott sub:** one double-track project
- 17 **Hannibal sub:** complete two siding projects started in 2014
- 18 **Ravenna sub:** two new double-track projects
- 19 **Sioux City sub:** new bypass track at Sioux City

### South Region

- 20 **Clovis sub:** one double-track project
- 21 **Mojave sub:** one double-track and one siding extension project
- 22 **Panhandle sub:** two new double-track projects
- 23 **Silsbee sub:** one new siding

### Terminals

- 24 **Aurora sub:** complete double-tracking project through LaCrosse, WI terminal (project started in 2013)
- 25 **Bellingham sub:** Everett, WA yard expansion
- 26 **Brush sub:** extend tracks at Sterling, CO and Denver, CO terminals
- 27 **Cherokee sub:** add new receiving / departure tracks at Tulsa, OK terminal
- 28 **Dickinson sub:** Dickinson, ND yard expansion

### Bridges

- 29 **Beardstown sub:** Bridge 212.07 in Metropolis, IL; design, permitting and land access ongoing with construction starting this year
- 30 **Fallbridge sub:** Bridge 24.8 over Washougal River in Camas, WA; permitting and right-of-way constraints continue with this project. Once project begins the replacement of the river bridge will take more than two years to complete.
- 31 **Fort Worth sub:** Bridge 348.5 in Fort Worth, TX; reconstruction of the bridge over the Trinity River
- 32 **Lafayette sub:** Bridge 32.06 in Des Allemands, LA; major work to the moveable bridge that crosses Bayou Des Allemands will start this year
- 33 **New Westminster sub:** Bridge 129.3 near Vancouver, BC; completing final phase of 3-phase project on bridge over Serpentine River
- 34 **Thayer South sub:** Bridge 482.1 in Memphis, TN; construction of the Memphis Bridge over the Mississippi River will be done in several phases. The first phase of the project will start this year. Other phases of the project are under design.
- 35 **Seattle sub:** Bridge 81.4 in Vader, WA; design, access and permitting ongoing with construction starting at the end of 2015

### Additional Projects

**Intermodal facility expansion:** Railcar loading/unloading track, support track and/or parking expansions at the following locations: Alliance (Haslet, TX); LPC (Elwood, IL); LPKC (Edgerton, KS); Lorenzo Rd (IL); Phoenix, AZ; Stockton, CA; Willow Springs, IL

**Automotive facility expansion:** Railcar loading/unloading track and/or parking expansions at the following locations: Alliance (Haslet, TX); Amarillo, TX; Portland, OR; San Bernardino, CA; LPC (Elwood, IL)

## Double Track and CTC Miles Added 2014-2015

Category	2014	2015P
DT Miles Added	82	129
CTC Miles Added	72	806
New Sidings	12	6
Extended Sidings	11	15

# RAIL INVESTMENT LEADS TO FEWER TRAIN DERAILMENTS

Derailments per million train-miles down 82 percent since 1980 and 45 percent since 2000



In recent years, America's freight railroads have been spending record amounts on the nation's rail network — including \$25 billion in 2013 and \$28 billion in 2014. All told, railroads have spent \$575 billion on infrastructure and equipment since 1980. Along with this spending, railroads have made great strides in safety with derailments per million train-miles down 82 percent since 1980 and 45 percent since 2000.

Notes: \*Class I railroad capital spending and maintenance expenses for infrastructure only  
 \*\* Total train accidents per million train-miles  
 2005=100

Source: Association of American Railroads, U.S. Federal Railroad Administration



# Energy Education Program: Concept Review

Institute for Energy Studies  
University of North Dakota

North Dakota Empower Commission

May 11, 2016



# Presentation Overview

## *What we hope to accomplish today*

- Context – why we asked for opportunity to meet:
  - Our belief: new, unique energy education opportunity
    - Energy System Engineering Degree Program
  - Potential role of North Dakota EmPower Commission:
    - Looking for directional support (not a funding request)
    - Facilitate engagement with member companies
- Today's Goals:
  - Introduce ourselves and concept
  - Obtain initial feedback
  - Identify potential next steps



## Proposed Feedback Questions

- Is the proposed content in line with the needs of the industry and the state?
- Do our proposed delivery methods meet the needs of the state?
- Who should be the targeted audience?
- How can we best help ND industry and the EmPower Commission meet its education and research objectives?



## Motivation

- We recognize ND needs to attract and excite new talent
- Because ND has broad energy resources, we are uniquely positioned to offer exciting content
- ND energy stakeholders need a broader view of the energy industry to respond to the seismic changes occurring
- Recognize opportunity to enhance competitiveness of our education and research
- Opportunity to partner with Empower Commission to address deficiencies
- Help various stakeholders understand what goes into energy policy



# Institute for Energy Studies:

Integrating Education and Research Across Campus

Premier Energy University

Science and Engineering

Arts and Sciences  
School of Engineering and Mines  
Atmospheric Sciences  
Energy & Environmental Research Center  
School of Medicine and Health Sciences  
College of Nursing

Business (economics and finance)

College of Business and Public Administration  
Center for Innovation  
Research and Economic Development  
Jodsaas Center

Policy and Regulation

School of Law  
College of Education and Human  
Development  
Earth System Science & Policy

Society and Behavior

Professional Integrity – Ethics  
Safety  
Management

- UND cross college
- EERC
- Experts in field
- International collaborations
- Coordinate professional development activities

## Unique Attributes of Program

Program Attributes	Implication
No residency requirement	Degree can be taken 100% distance while working full-time. UND has a well respected and accredited distance engineering program
Flexible research topics	Research can address specific problem at employee workplace
Appointments of industry representatives to student research committees	Will allow employer to serve on research committee to help direct research
Adjunct appointments content experts	UND faculty can provide logistical support allowing expert to focus only on delivery of material
Combine certificates into degree (awaiting approval)	Student see reward after nine credits rather than 30
Executive style masters (under consideration)	Allows contact time to be condensed
Hybrid degree / not a traditional engineering or a traditional MBA degree	Provides students with skills to integrate management skills into an engineering system setting
MS and PhD / Thesis or non-thesis	Multiple degree options to match student interests and needs
Able to roll out short courses (not for credit or for ceu or pdu)	Material covered in coursework can be repurposed in condensed format to meet specific training needs of stakeholders

## Focus Areas / Course Topics under Consideration

No-Technical – Tools for policy, management and decision making

- Energy Policy / Public Policy Analysis
- Engineering Project Management
- Forecasting Energy Supply and Demand / Engineering Risk Management /
- Strategic Market Planning / Business and Economic Forecasting
- Economic Decision Making / Managerial Finance / Accounting Information for Decision and Control
- Engineering Leadership and Communication for the Professional
- Law and Ethics
- Systems Design and Management Tools



## Focus Areas / Course Topics under Consideration

Technical – Focus on Integration of Energy Resources

- Foundations of Systems Engineering
- Fuels Technology (conventional power generation systems)
- Alternative Energy Systems / Renewable Energy Systems
- Power Systems
- Air Pollution Control / Industrial Wastes / Environmental Engineering (pollution control)
- Energy Integration
- Quality Control / Six Sigma, Statistical Methods
- In-depth course on specific energy source
  - Gas Turbines / Internal Combustion Engines / Fluid-Bed Combustion / Geothermal Energy



## Take Aways

- IES / EmPower partnership: key source of ND competitive advantage
  - Multiple benefits through closer collaboration
- Potential role for Commission to support UND mission
  - Facilitate engagement with member companies
    - Work with us on details / contact within company
  - Provide / assist with programmatic direction
  - Participate on IES external advisory board
  - Utilize UND IES experts on subcommittees promoting education and workforce development
  - Other ?
- Your input is critical in establishing the best education and research program at UND



## Contact Information

### **Institute for Energy Studies**

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### **Michael Mann, Director**

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[www.engineering.und.edu/institute-for-energy-studies/](http://www.engineering.und.edu/institute-for-energy-studies/)  
Telephone No. (701) 777-3852  
Fax No. (701) 777-3773



# Empower Infrastructure Subcommittee

Prioritize/Justify & Validate the Big Picture and need for strategic investment into infrastructure that builds our energy future

Consider funding options that address critical needs that grow the long-term growth of North Dakota's energy resources. Energy development and growth will not occur without the critical infrastructure in place from a private and public standpoint

# Five Key Infrastructure Needs for Energy Production and Value Added Energy

1. Water Availability –
  - If North Dakota doesn't utilize it – others will!
2. Reliable Feedstock – natural gas, ethane, etc...
  - Multiple supply options
3. Electric Power – reliable and low-cost
4. Roads & Transportation Options
  - County to county connectivity @ 105.5 lbs.' along with uniform permitting and fees
5. Workforce
  - 80% of ND's Population Increase is located in nine communities
  - Skill trades education & training
  - Affordable Permanent and Temporary Housing

# No Surge - what to do? Good Time for Smart & Strategic Investments

Recognizing revenues for Surge funding or energy impact funds are not likely to be available, we recommend focus on **three key areas**:

1. Funding mechanisms that allow communities leverage and financial support for Critical Community Infrastructure
  1. Support Upper Great Plains plan to prioritize on economic value/2 yr. plan
  2. Consider low-interest loans or tax credits buy-down costs to communities
  3. Funds should be to complete existing critical need or strategic value projects
    - Upgrade and Maintenance
  4. Oil Impact funds should focus on EMS

## 2<sup>nd</sup> of Three Key Infrastructure Issues:

### 2. Easements/Right of Ways – Landowner Concerns

- Huge Issue – no silver bullet
- Continue funding for Ombudsman Program
  - This Program Works
  - Ag Department has done a good job

## 3rd of Three Key Infrastructure Issues:

- 3. Clarify Jurisdictional Authority - Infrastructure Projects will not get built if applicants successfully follow a prescribed statewide process and then are subject to the project being derailed by a vocal special interests at another level of government.*

### *Citing/Permitting/Zoning:*

- Local input and discussion are valued, but should not duplicate a state permitting process, create jurisdictional uncertainty, or delay the project once a statewide permit has been issued.*
- The input must follow the prescribed process and preserve the due process designed for state oversight and authorization.*
- 53 sets of rules, or 300+ city rules, or 1430 township rules is a recipe for no growth, no jobs, and high taxes.*

# Why Fund Infrastructure in Down Times?

- Adequate infrastructure including roads, water resources, pipelines, railroad, transmission lines and housing – is the key to future energy development of North Dakota's energy resources.
- Critical infrastructure not only promotes development it minimizes development impacts and enhances public safety.
- More bang for a buck!

# EmPower R&D Subcommittee

North Dakota R&D Pathways  
Presentation to ED&T Committee  
May 11, 2016

# Subcommittee Purpose

The purpose of the committee is to identify R&D priorities for North Dakota's Energy Industry and make policy recommendations that will enable R&D success.

# R&D Subcommittee Process

Assess R&D priorities, competitiveness and adequacy of policy & funding

Input for research community (EERC, NDSU, EPRI, LEC)

Identify Gaps/Assess funding adequacy

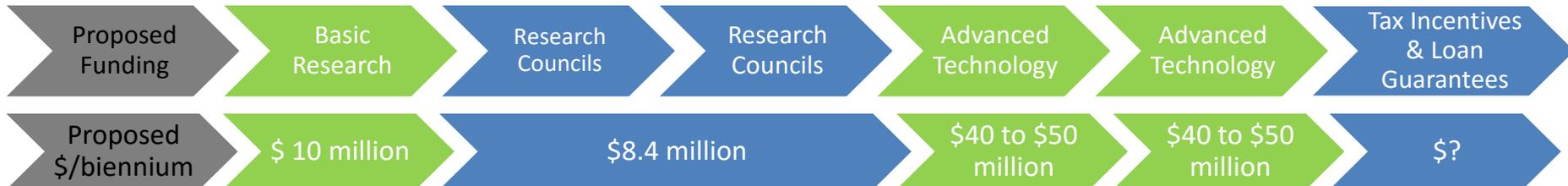
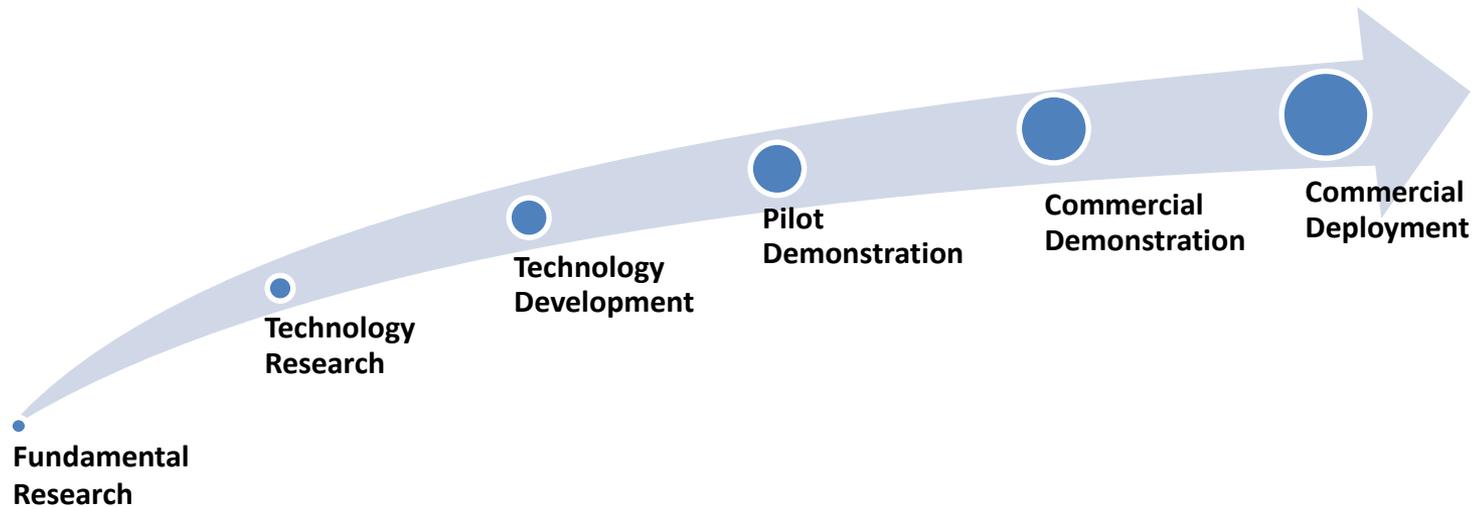
Policy Recommendation

EmPower Support

We are here



# Typical Technology development Pathway & Funding

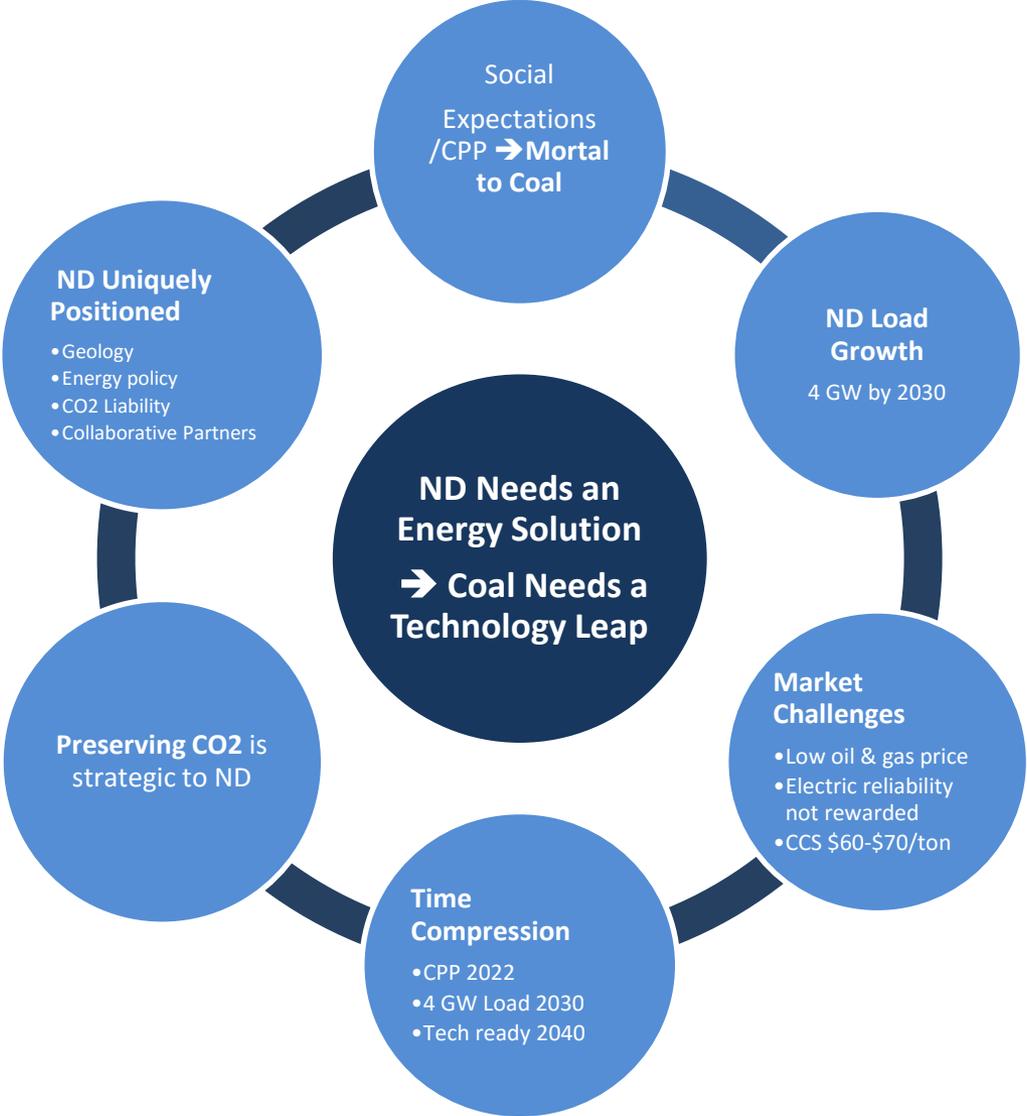


# North Dakota Allam Development Initiative

*A next generation energy solution for  
North Dakota*

Presented by Wade Boeshans  
President & GM BNI Energy Inc.  
May 11, 2016

# ND Landscape Assessment



# Our Solution → A Broad Vision

*Sustainable Solution for lignite married with a sustainable solution for tertiary oil recovery in the Bakken:*

- *Demonstrate the Allam technology, then develop and build a commercial electric generation plant in North Dakota using local lignite*
- *Transport CO<sub>2</sub> from Allam plants to depleted conventional ND oil fields for Enhanced Oil Recovery and sequestration*
- *Develop a solution for tertiary oil recovery in the Bakken using CO<sub>2</sub>*

# Allam Cycle Preserves the “Coal Option”

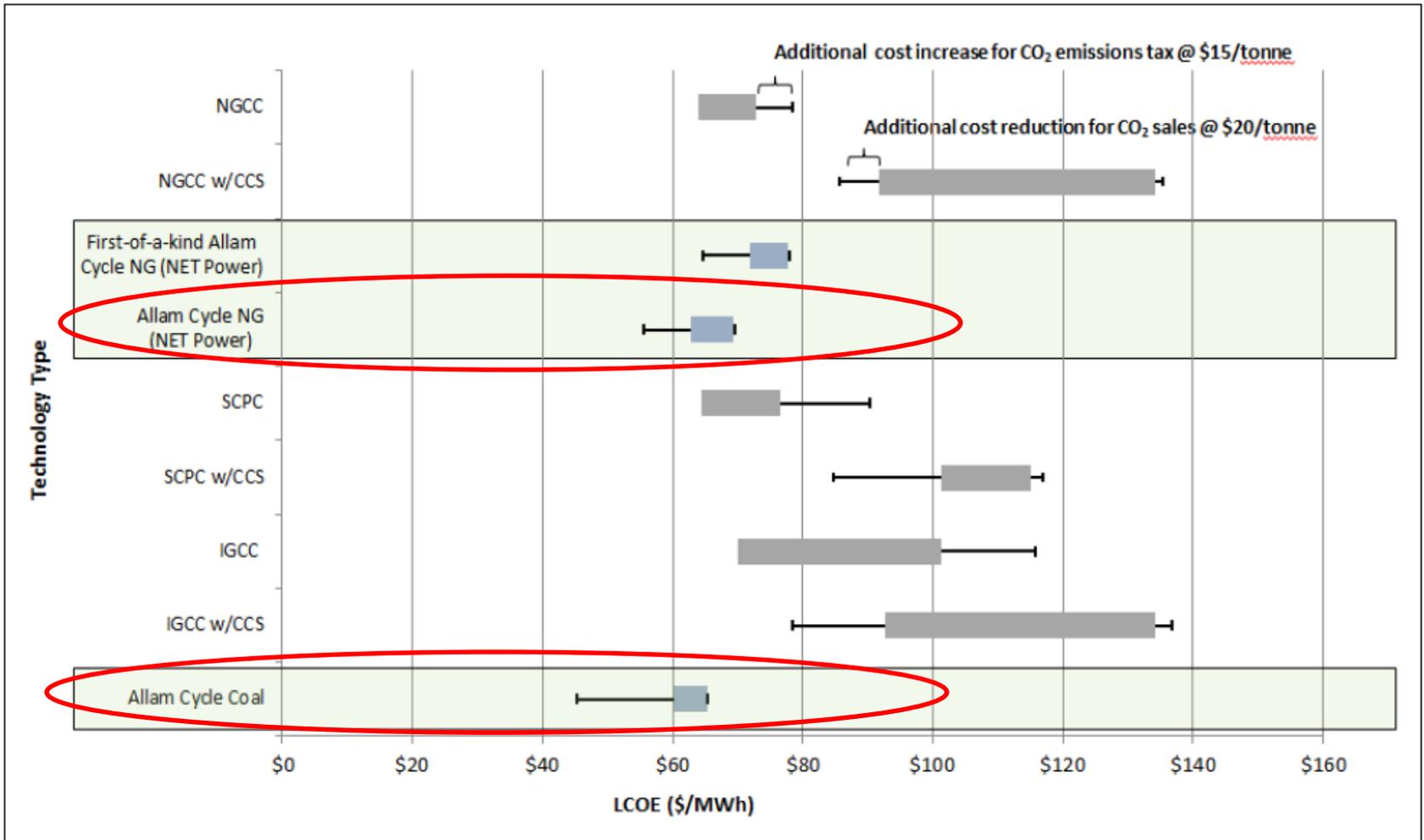
The Allam Cycle is **next generation technology**.

- The turbine is driven by **supercritical CO<sub>2</sub>**
- **Near-zero emissions** - 100% of the CO<sub>2</sub> available for utilization.
- **Efficiency estimates nearing 50%** - 1.4x higher than the U.S. coal fleet average.
- **Economic Power Generation**
  - \$0.04-\$0.05 /kWh with sale of CO<sub>2</sub>
  - \$0.06-\$0.07 /kWh without the sale of CO<sub>2</sub>
- **Smaller Footprint** - 20% of a traditional coal-based plant.
- **Exceeds 111(b) NSPS rule from EPA.**

# Allam Cycle Preserves the “Coal Option” cont.

- Research, engineering, and lab-modeling has been **successfully conducted**
- A 25 MWe natural gas-fired demonstration plant is currently **being constructed** in Texas.
- Further development creates a **path forward** for continued utilization of coal.
- Substantial **investment already committed** from federal, state, international and industrial partners.

# Clean, low-cost electricity competitive with all state-of-the-art systems



**Note:**

- LCOE calculated using EPRI methodology
- Assumes \$6.50/MMBtu natural gas and \$2.00/MMBtu coal
- Cost ranges represent data from several sources: EIA (2013); Parsons Brinkerhoff (2013); NETL (2012); Black & Veatch (2012)

Courtesy from Net Power & 8Rivers

# Why North Dakota?

## **Technical Expertise**

- Commercial gasification experience
- Gasifier technology development
- Internationally recognized leadership at EERC

## **Enhanced Oil Recovery Potential**

- New coal plants will require CO<sub>2</sub> capture
- Billions of barrels of additional oil may be recovered thru EOR in North Dakota

## **ND must Host to control our own destiny**

- North Dakota leads the way in environmentally sustainable fossil fuel production

# Working Together to Accelerate a Pathway to Low-Carbon Lignite Utilization

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**DAKOTA  
GASIFICATION  
COMPANY**



8 RIVERS



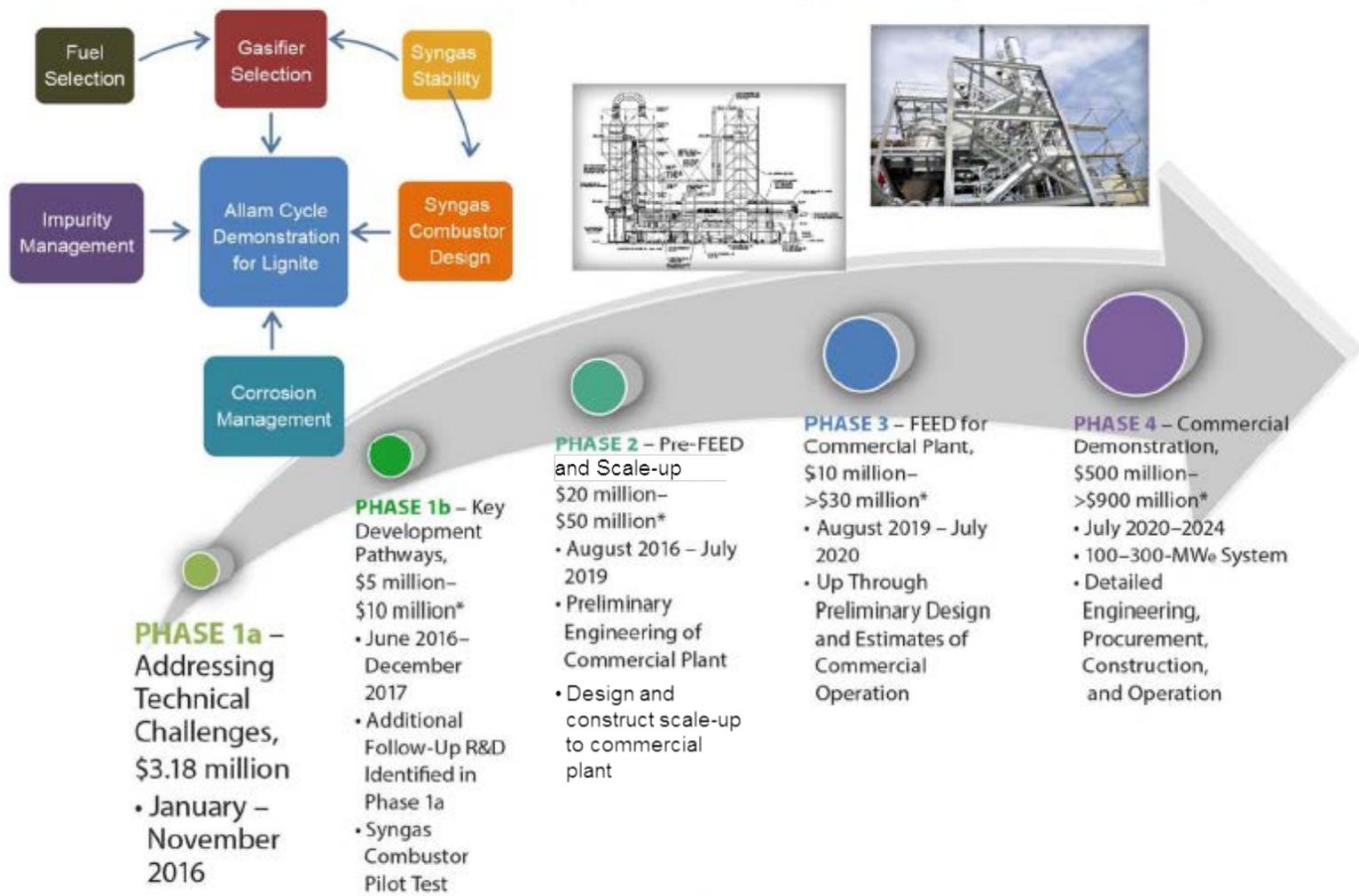
**U.S. DEPARTMENT OF  
ENERGY**



**EERC**  
Energy & Environmental Research Center®

# Our Path Forward

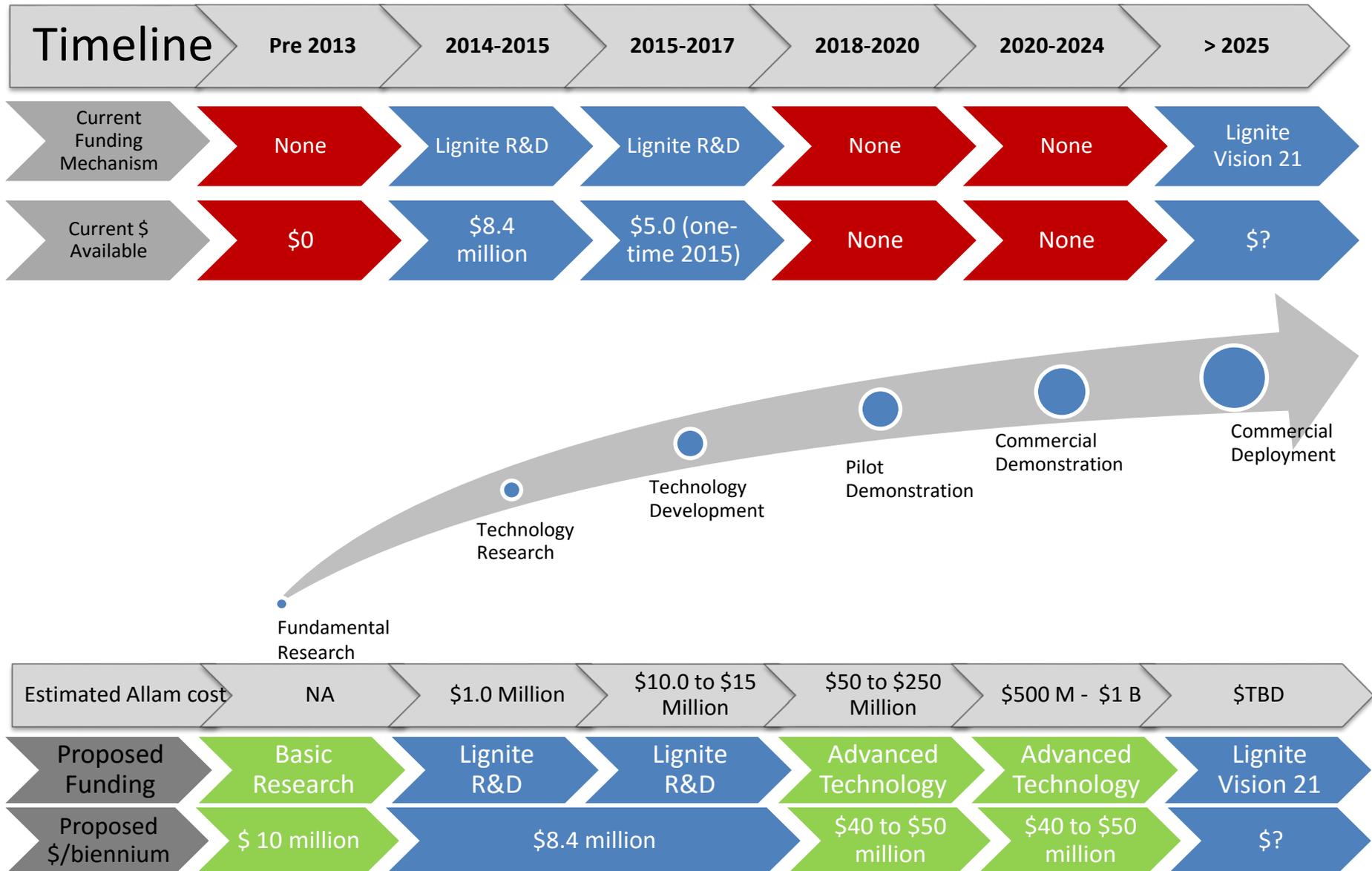
## Lignite-Based Allam Cycle Technology Development Road Map



EERC JS51631.AI

\*Costs are estimated and include matching support from federal and industrial sponsors.

# Allam Cycle Development Pathway & Funding



# Keys to Success

## 1) State, Federal & Energy Industry Collaboration

→ Lignite & Petroleum Industry Alignment

## 2) Maintaining state primacy

→ Ensure ND agencies have the resources they need

## 3) Communications → Vision vs. Policy

→ Frame positive messages

→ The science is not proven/commercial

→ Time is of the essence

→ Message Clarity

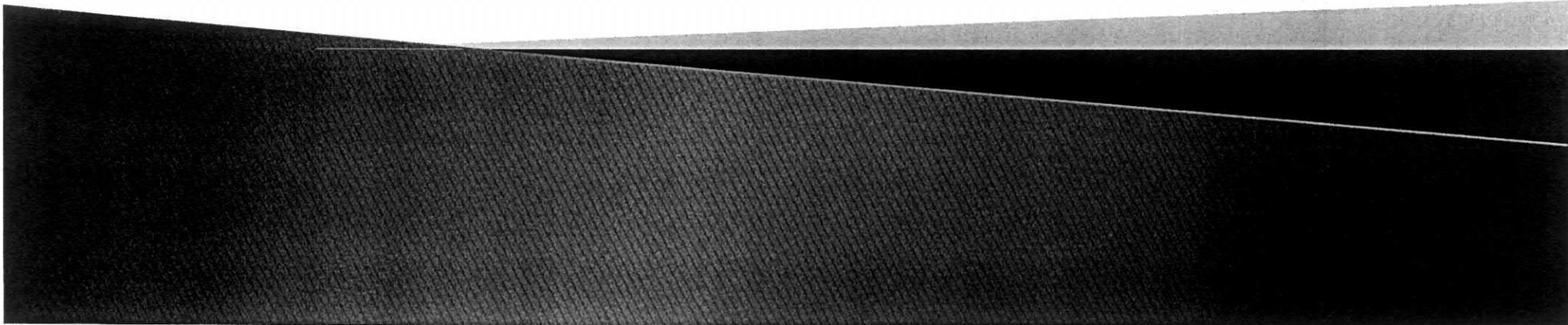
- Tundra / Allam
- Conventional / Unconventional EOR

# **EmPower Regulatory Subcommittee**

## **Sales and Use Tax Exemption – Wind Energy**

Presentation to the Energy Development and  
Transmission Committee

May 11, 2016

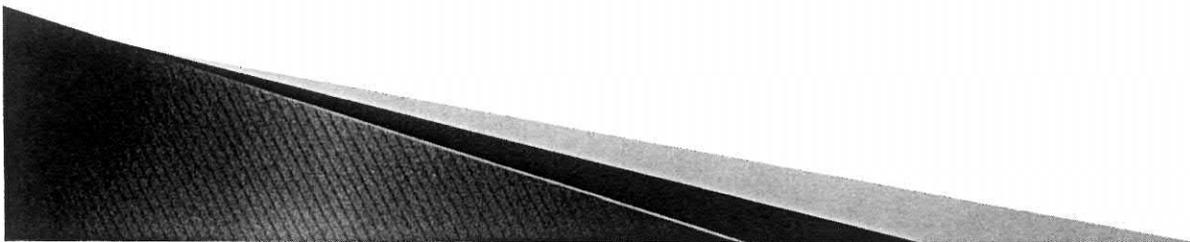


# History

- A sales and use tax exemption for purchases of production equipment and other tangible personal property used to construct wind-powered electric generating facilities (wind energy facilities) was initially implemented in 2001
- The sales and use tax exemption for wind energy facilities has been extended twice, once in 2009 and again in 2013
- The existing sales and use tax exemption expires at the end of 2016
- All other fuel types used to produce electricity enjoy a permanent exemption of sales and use taxes

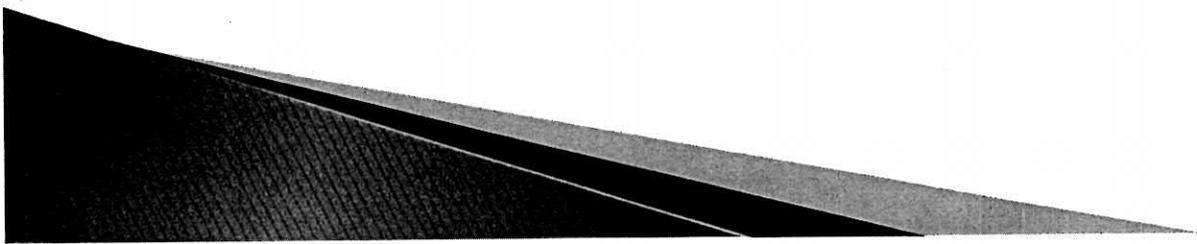
# Investment Decision Impacts

- Sales and use taxes are a major factor in the cost of constructing a wind energy facility
- Temporary tax exemptions create contingent planning horizons for large capital projects
- Existing state laws are included in base assumptions when considering a major capital investment
- When a tax exemption has an expiration date, the decision to make a major capital investment assumes the tax exemption will expire per existing state law and will not be extended



# Electric Consumer Impacts

- A project that incurs sales tax on the cost of construction materials will require a higher price for its product, in this case electricity
- As wholesale electric prices have fallen, the impact of a sales and use tax has increased as a percent of the total cost of building a new wind energy facility
- Higher costs to build a wind energy facility will result in higher prices ultimately results in higher electric prices for energy consumers
- Unpredictable tax policy yields an unreliable tax climate



# Recommendation

- The sales and use tax exemption for wind energy facilities should be made permanent
  - North Dakota policymakers have recently moved in a direction to implement more consistent tax policies across fuel types
  - During the 2015 legislative session, the legislature passed legislation (SB 2037) that requires all wind generators to pay a generation tax using the equivalent methodology that is used for other fuel types such as natural gas
  - To further levelize the playing field among fuel types, the legislature should apply the same sales and use tax exemption for new electric generation consistently across all fuel types
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