

# ENERGIZING NORTH DAKOTA'S FUTURE



# 2018 *ADVANCING THE GOALS*

**NORTH DAKOTA HAS A STRONG TEAM** of industry partners, state organizations, and universities dedicated to a more prosperous, cleaner, and brighter energy future. North Dakota is the role model for the world. The Energy & Environmental Research Center (EERC) is working with regional partners to advance technology to support an all-of-the-above approach to energy production. In 2017, we identified seven goals to be achieved through technology development. With the continued support and collaborations of our partners, progress has been made toward achieving each one of these goals.

## **GOAL 1 – Reach at Least 2 million barrels of Oil Production per day**

- Analytical techniques to enhance understanding of Bakken oil in unconventional rocks.
- Enhanced recovery techniques to improve the Bakken recovery factor.
- Technology for legacy fields in North Dakota to produce remaining oil.
- New approaches to overcome environmental challenges, such as flaring, volatile organic compound emissions, and transport challenges.



## **GOAL 2 – Capitalize on Agricultural and Energy Synergies**

- Carbon capture, utilization, and sequestration (CCUS) for ethanol production.
- Technology for ammonia production using North Dakota renewable and fossil electricity.
- Technology for biofuel and biochemical production.
- Enhancing agricultural production in open field and greenhouse facilities using CO<sub>2</sub> and hot water from Blue Flint Ethanol/Coal Creek.
- Job creation, state tax revenues, and local economic impacts of CCUS.



## **GOAL 3 – Maximize the Use of Natural Gas**

- Enhanced recovery techniques and reservoir pressure enhancements in North Dakota reservoirs with raw (unprocessed) natural gas.
- Performing technical and economic analysis of new and emerging technologies that can support increased in-state utilization of North Dakota's gas resources.

## **GOAL 4 – Eliminate Pipeline Leaks**

- Completing a legislatively commissioned study to improve pipeline operations and reduce leaks.
- iPipe (intelligent Pipeline Integrity Program) – a joint industry–EERC program to demonstrate new and emerging technologies to prevent and detect pipeline leaks.
- Integrating artificial intelligence/machine learning capabilities for next-generation pipeline operations.



## GOAL 5 – Enhance Energy Reliability and Energy Export Opportunities

- Major comprehensive techno-economic study that links North Dakota coal, power production, carbon capture, CO<sub>2</sub> transport, and enhanced oil recovery (EOR) in North Dakota.
- Utilizing machine learning for improved electrical grid management to better balance electrical demand with distributed energy resources (e.g., renewables and energy storage) to minimize baseload cycling.
- Bolstering national security and economic prosperity by fully understanding North Dakota's indigenous resources (coal, oil, natural gas and natural gas liquids, rare-earth elements [REE], energy crops, coal ash, produced waters, wind resources, solar) and linkages to global markets.

## GOAL 6 – Take Full Advantage of North Dakota's Lignite

- Conducting field evaluations of North Dakota formations for carbon sequestration (CarbonSAFE).
- Linking North Dakota EOR opportunities with CO<sub>2</sub> sources.
- Demonstrating the long-term strategic importance of CO<sub>2</sub> for maximum Bakken recovery.
- Carbon capture technology for use on North Dakota's existing fleet.
- Next-generation lignite utilization technology for new plants.
- Advancing understanding of lignite's value beyond electrical power applications, such as REEs.



## GOAL 7 – Educate the World on Energy and Environmental Topics

- Documentaries (seven to date with Prairie Public Television), fact sheets, and teacher- training work shops.
- Creating the University of North Dakota Energy Hawks student research initiative.
- Providing networking opportunities and informational presentations by hosting Energizing North Dakota.
- Disseminating information on energy and environmental projects through website content, on-site tours, and presentations to schools and community groups.
- Demonstrating North Dakota's global leadership in energy through participation in international, national, and regional trade press, television, radio, peer-reviewed literature, interviews, legislative testimony, keynote and conference presentations, and more.



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