Enhance, Preserve and Protect Project

Research & Development, Environmental And Transmission Planning Services

JULY 1, 2019 – December 31, 2022

Prepared by
The Lignite Energy Council
1016 E. Owens Avenue
P.O. Box 2277
Bismarck, North Dakota 58502

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ABSTRACT

The Enhance, Preserve and Protect (EPP) Project continues to build on the ongoing commitment and cooperation among government agencies, elected leadership and the lignite industry to ensure the long-term viability of the North Dakota lignite industry. The project began as the result of an extensive analysis by leaders of the lignite industry focused on the state of the industry in North Dakota, as well as the coal industry nationwide. The analysis concluded that federal legislative and regulatory policy moved in a direction which jeopardized the future development of North Dakota's vast lignite resources, and created great uncertainty regarding the viability of existing lignite generation plants. The regulatory environment continues to be dynamic, and the EPP Project will continue to work with industry and regulators so that North Dakota can make the best use of our vast lignite resource into the future.

Initial project work included development of a technology development roadmap under the guidance of the lignite industry. This roadmap will continue to be updated as needed to guide technology development required for lignite conversion systems. The EPP Project will focus on preserving and enhancing the existing lignite industry, while at the same time providing continued technical support to activities under the Advanced Energy Technology (AET) Program which focuses on new opportunities to capitalize on the vast lignite resources. The State of North Dakota and lignite industry continue to benefit from the EPP, as they supply energy to regional residents and industry, while strengthening the economy through creation of jobs and clean, low-cost reliable electricity.

Project Summary

One of the primary objectives, of the EPP Project is to preserve and protect the existing lignite fleet in North Dakota. The Project also continues to look to the future and assist the State and industry in understanding where the "new" opportunities are for this abundant resource in the future. Finally, the Project will continue to explore new avenues to develop value-added opportunities for lignite and it's combustion byproducts. Options include rare earth elements that exist in significant quantities in the lignite found in North Dakota, using excess process heat and CO_2 from power plants to develop green houses, development of carbon materials from lignite, and carbon dioxide used for enhanced oil recovery, to name a few. Value-added opportunities will also include demand side technologies that can consume off-peak electricity, such as electric vehicles and data mining.

To achieve the EPP Project objectives, the EPP Project team will develop and implement research & development, environmental, legal and transmission strategies. These strategies will include addressing technology challenges for existing plants to achieve compliance with regulations and to discover new and innovative ways to use lignite and

its byproducts in order to ensure the future of lignite in North Dakota for years to come. Additionally, the EPP Project team will enhance the partnership with the State by working with state agencies and officials to understand the legal and economic implications of legislative and regulatory initiatives of the lignite industry, one of North Dakota's largest industries. The Project team will also monitor the progress of current and future Advanced Energy Technology projects and eliminate any potential duplication of efforts among these activities, thereby maximizing value for the State of North Dakota. Strategic studies will be performed for better understanding the value of technology developments, provide critical information for the State on commercial potential of emerging markets, evaluate the economics associated with technologies and the lignite industry, and the impacts of outside factors on the industry and North Dakota.

Key personnel involved in the management of the Enhance, Preserve and Protect Project are Jason Bohrer, LEC President/CEO and EPP project policy advisor; Mike Holmes, technical representative to the NDIC, and Project Manager; Jonathan Fortner, environmental management lead; and John Weeda, director of the North Dakota Transmission Authority. The EPP project team will work together with consultants who have research & development, environmental, legal and transmission technical expertise to complete the project activities. The EPP Project is seeking $3,051,961 from the North Dakota Industrial Commission (NDIC) over a period of 42-months (July 1, 2019 – December 31, 2022).

BACKGROUND

A. State Policy

In 1991, the North Dakota Legislative Assembly enacted legislation creating the Lignite Research, Development and Marketing Program and declaring that:

> "...it is an essential governmental function and public purpose to assist with the development and wise use of North Dakota's vast lignite resources by supporting a lignite research, development, and marketing program that promotes economic, efficient, and clean uses of lignite and products derived from lignite in order to maintain and enhance development of North Dakota lignite and its products; preserve and create jobs involved in the production and utilization of North Dakota lignite; ensure economic stability, growth, and opportunity in the lignite industry; and maintain a stable and competitive tax base for our state's lignite industry for the general welfare of North Dakota....." (NDCC § 54-17.05-01)

In the past, the North Dakota Legislative Assembly has appropriated funding from the Lignite Research Fund for the purpose of contracting for services that will focus on the preservation of existing jobs and production, as well as the growth of the lignite industry. The NDIC, with policy advice and funding recommendations from the Lignite Research Council, has administered this program. As guidance to the NDIC for the use of the nonmatching funding, the Legislature stated that:

"...Moneys appropriated pursuant to this section may...be used for the purpose of contracting for nonmatching studies and activities in support of the Lignite Vision 21 Project; for litigation that may be necessary to protect and promote the continued development of lignite resources; for nonmatching externality studies and activities in externality proceedings; or other marketing or environmental activities that assist with marketing of lignite-based electricity and lignite-based byproducts..." (Chapter 14, Section 11, 2011 ND Session Laws)

During the 2017 North Dakota Legislative Assembly, the State approved an additional $3 million from the Strategic Infrastructure and Improvements Fund for supporting the AET projects directed at late-stage evaluation of technologies under consideration for commercial application in North Dakota. In the current North Dakota Legislative Assembly, the State approved an additional $10 million. The AET allows expansion of the projects beyond Lignite Vision 21, to include technology solutions for existing plants, including carbon capture and low carbon options.

B. Industry Economic Impact, Challenges, and Opportunities

Over the years, lignite producers in North Dakota have maintained a fairly steady annual production level at approximately 30 million tons. North Dakota ranks as one of the top ten coal producing states in the country and as of 2019 is the top lignite mining state in the country. In 2017, the lignite industry employed 3,820 people and created an additional 10,200 indirect and induced jobs. The industry's gross business volume estimated at $5.7 billion, as well as total state and local revenue of $130 million per year. In addition, the industry continues to provide the clean, low-cost, reliable electricity that is the cornerstone of our State economy.

After strong growth in the 70s and 80s, the market for electricity produced by North Dakota lignite reached a plateau. The start-up of the combined heat and power Spiritwood facility near Jamestown in 2014 marked the first new lignite-based energy conversion facility in over 20 years. This is a significant milestone in light of the challenges facing the lignite industry. These challenges include increasingly stringent federal environmental regulations; competition from other energy sources; legislative mandates from surrounding states which impact the continued use of lignite-based electric generation and concerns about the adequacy of transmission infrastructure in light of oil and gas development in western North Dakota, as well as constant monitoring of the status of export constraints on the existing transmission system. In addition to limiting sale of lignite fired electricity, transmission constraints can increase the impact of regional wind power on the existing coal units.

Another challenge to the State of North Dakota and the lignite industry is to design a comprehensive program to alter the present "anti-coal" campaign and replace it with a strategy that recognizes the importance of all forms of energy as a way to ensure our nation's energy security, as well as the strategic importance of the many value-added

opportunities available through new innovations that have been identified Lignite-based electric generation has been at the heart of North Dakota's economy for decades, providing low-cost reliable and dispatchable electricity to farmers, ranchers, businesses (large and small) and consumers. If the on-going campaign to eliminate coal is successful, affordable electricity to fuel North Dakota's future will be a thing of the past. To continue to address this changing landscape, the lignite industry plans to continue the focus on its regulatory/legislative program, as well as enhancing its research and development work. The purpose of the EPP Project is to continue to align industry efforts with the State's mission to "maintain and enhance development of North Dakota lignite" in order to strengthen the industry/State partnership. Through this refocused effort, the State of North Dakota will benefit from continued access to low-cost, reliable and clean energy as well as have the opportunity to see new industries locate in ND like Rare Earth Element extraction to provide critically needed material for numerous 21st Century applications that require these materials. This is one of the many emerging markets with potential for application in North Dakota. Others include carbon based materials, additional fertilizer production, and combined heat and power projects that use the remaining process heat from lignite power plants.

A continually growing focus of the State/Industry partnership has been in solutions for carbon management. North Dakota has a unique opportunity to diversify the products from lignite fired power plants by adding CO_2 as a commodity. CO_2 captured from lignite fired power plants could facilitate a second round of oil recovery from the conventional oil fields as well as in the Bakken formation. This would greatly increase the tremendous economic boom experienced over the last decade resulting in economic activity to the benefit of all North Dakotans. A study performed to evaluate the impact of carbon capture and use in North Dakota oil recovery showed that the impact on employment alone could be as high as 14,000 additional jobs.

PROJECT DESCRIPTION

A. Overall Objectives

The objective of the EPP Project is to protect and extend operation of the existing lignite facilities, while at the same time seeking technology solutions for existing plants and new technologies for the future of the North Dakota lignite industry. To achieve the EPP Project objectives, the Lignite Energy Council (LEC), in conjunction with the lignite industry partners, will continue to develop and implement research and development, environmental, legal and transmission strategies that will enhance, preserve and protect existing facilities and the future development of North Dakota's lignite resources. The EPP Project team will monitor progress, avoid duplication of services and maximize value to the State by working with industry, technology developers, federal and state agencies and other interested parties in finding solutions that will allow the State to maintain existing lignite facilities and to provide for new growth in the lignite industry. Activities and tasks that will be addressed by the EPP Project include:

- Project Management;
- Research & Development Studies and Activities;

- Environmental Strategies & Activities;
- Legal Strategies and Activities; and
- Transmission Strategies & Activities.

Key personnel involved in the management of the Enhance, Preserve and Protect Project are:

- LEC President/CEO Jason Bohrer, who will serve as a policy advisor to the EPP Project,
- Technical Representative to the Industrial Commission and Project Manager Mike Holmes will provide project oversight and will lead R&D, project administration, and strategic studies activities,
- Jonathan Fortner will oversee the environment strategies and activities, and
- John Weeda will serve as the ND Transmission Authority Director.

The Project team will work along with consultants who have legal, research & development, environmental, and transmission technical expertise to execute the project. A description of the management organization and qualifications of key personnel are outlined on pages 13, 14 and 17. The organizational chart is provided in Appendix 2.

B. Statement of Work

The EPP Project team will provide overall management responsibility for the project. Key personnel identified above will be responsible for completing EPP Project Tasks and achieving program objectives. The timeframe for the Project is estimated at 42 months (July 1, 2019 to December 31, 2022) with an estimated budget of $3,051,961. Tasks and timeframes for the project activities are provided below in the Project Schedule, and are summarized in Section C, Task Summaries.

Project Schedule w/ Milestones & Deliverables

Enhance, Preserve and Protect Project

TASK	2019						2020												2021												2022											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Task 1.0 Project Management																																								
1.1 Reports	X						X						X						X						X						X						X					X
1.2 Advanced Energy Technology Projects																																								
1.3 Administration and Support																																								
Task 2.0 Research and Development																																								
2.1 Preserve, Protect and Enhance R&D																																								
Task 3.0 Environmental Strategies																																								
3.1 Technical Services Coordination																																								
Task 4.0 Legal Strategies																																								
4.1 Coordination of Legal Strategies																																								
Task 5.0 Transmission Activities																																								
5.1 Transmission Development Planning																																								
5.2 OwnerDevelopment Outreach																																								
5.3 Government Interaction																																								
5.4 Technical Services																																								

Legend:

Schedule:
Task Complete:

Summary of Milestones and Deliverables :

Contract Award / Project Start: July 1, 2019
Overall Project Management:
Semi Annual Reports: (marked by X)
Final Report December 31, 2022

QUALIFICATIONS

A. Capabilities and Experience

The Lignite Energy Council is a trade organization comprised of 260+ members, including major lignite producers who produce a total of 30 million tons annually, the nation's largest commercial gasification project, and investor-owned utilities and rural electric cooperatives from a multi-state area that generate electricity from lignite serving millions of people from Canada to Texas. For over 25 years, the Lignite Energy Council has maintained a formal partnership with the NDIC to assist with administration of the Lignite Research, Development and Marketing Program and provide technical assistance to the NDIC.

Besides partnering with the NDIC on the development and implementation of the state's research and development program, the Lignite Energy Council manages a regional public relations program for lignite-based electricity and an education program that trains teachers from across the region about the lignite industry. Because of the important impact that governmental policies have on the competitive position of lignite and the ability to develop new lignite projects, the Lignite Energy Council is also involved in various governmental relations activities such as legislative, Congressional, and public official forums and briefings.

The Lignite Energy Council has effectively managed similar contracts with the NDIC dating back to May 1999. Based on this experience and the above-described capabilities, the Lignite Energy Council is capable of administering the Enhance, Preserve and Protect Project.

B. Key Personnel

EPP Project Policy Advisor

Jason Bohrer has served as the president and the chief executive officer of the Lignite Energy Council since July 2013. He earned his bachelor's degree from North Dakota State University and a law degree from George Mason University. He served as a communications director for the Idaho Republican Party and as chief of staff to U.S. Rep. Raul Labrador (R-Idaho) before joining the Lignite Energy Council. Prior to moving to North Dakota, he lived in Washington, D.C., for nearly a decade. Besides his work with Rep. Labrador, he also is a former legislative counsel for U.S. Senator Jim Risch (R-Idaho). Bohrer also serves as chairman of the Lignite Research Council.

Expertise of the Technical Representative and Project Manager

Mike Holmes has over 30 years of experience with the development of technologies leading to the clean and efficient use of coal. Prior to coming to the Lignite Energy Council, Mr. Holmes spent 15 years each in technology development at Babcock and Wilcox in Alliance, Ohio and The Energy and Environmental Research Center (EERC) at the University of North Dakota. At the EERC, he served as Director of Energy Systems Development, where he oversaw fossil energy research areas. His principal areas of interest and expertise include CO_2 capture; fuel processing; gasification systems for

coproduction of hydrogen, fuels, and chemicals with electricity; process development and economics for advanced energy systems; and emission control technologies. In January of 2017 he was hired to serve as the Vice President of Research and Development for the Lignite Energy Counsel, and the NDIC appointed Mr. Holmes to serve as the Technical Advisor to the NDIC for the North Dakota Lignite Research, Development and Marketing Program. Mr. Holmes received B.S. degrees in Chemistry and Mathematics at Mayville State University and his M.S. degree in Chemical Engineering at the University of North Dakota.

Environmental Management Lead

Jonathan Fortner was hired by the LEC in January 2018 as director of government relations to support the policy efforts and oversee environmental strategies and activities. Prior to joining the LEC, he worked as a research consultant for the Minnesota House of Representatives. Fortner earned an undergraduate degree from Presentation College in Aberdeen, South Dakota, and also earned two master's degrees – one in business administration and the other in public administration – from the University of North Dakota in Grand Forks.

Expertise of the ND Director of the Transmission Authority

John Weeda has served as the Director of the North Dakota Transmission Authority since February 2018. He retired in 2017 as the director of North Dakota Plant Operations for Great River Energy. He was selected to serve as the director of the North Dakota Transmission Authority by the North Dakota Industrial Commission. Weeda is a Mandan, ND, native, and worked 41 years with Great River Energy. He graduated from the University of North Dakota with a bachelor's degree in mechanical engineering. He spent the majority of his career at the Coal Creek Station where he worked in various positions before becoming plant manager in 1989. He was promoted to director of North Dakota Plant Operations in 2010 and supervised all three of Great River Energy's coal-based power plants: Coal Creek Station, Stanton Station and Spiritwood Station, until his retirement.

Resumes of EPP Consultants are available upon request.

VALUE TO NORTH DAKOTA

With an existing lignite fleet representing more than $18 billion of capital investment in North Dakota, it is imperative that regulatory and statutory initiatives at the federal level or initiative by states in the region be cost-effective and based on sound science. The primary objective of the EPP Project is to protect and preserve the industry investment. The State stands to lose approximately 3,800 direct jobs and a significant portion of the over 10,200 indirect and induced positions related to providing services to the industry if as partners, the State and the lignite industry cannot find technology solutions and proactively address the development of reasonable regulations based on sound science.

Also directly at risk, if the existing lignite industry is not protected, is state and local revenues of over $130 million and gross business volume for the industry estimated at $5.7 billion annually. The value to North Dakota of the EPP Project grant is the ability to enhance, preserve and protect an industry that has provided low-cost and reliable electricity to the region for many generations. In addition, the EPP Project provides value to North Dakota by identifying and promoting emerging markets for lignite growth.

MANAGEMENT

See description of project management under "Project Description, C. EPP Project Task Summaries." Also see Organizational Chart in Appendix 2.

TIMETABLE

The Enhance, Preserve and Protect project will begin under this contract on July 1, 2019 and end on December 31, 2022. Semi-annual Project reports will be submitted to the NDIC as stated in the "Project Description" section. In addition to confidential project reports, non-confidential project summaries will be prepared.

MATCHING FUNDS

The EPP project will use nonmatching funds from the Lignite Research Fund consistent with the intent of the North Dakota Lignite Research, Development and Marketing Program as described in the "Background, A. State Policy" section. Previous grants for the EPP Project were approved to use nonmatching funds from the Lignite Research Fund. The total nonmatching funds requested are $3,051,961.

TAX LIABILITY

I, Jason Bohrer, certify that the Lignite Energy Council is not delinquent on any tax liability owed to the State of North Dakota.

Jason Bohrer, President/CEO
Lignite Energy Council

CONFIDENTIAL INFORMATION

The applicant requests confidentiality pursuant to Section 54-17.5-06 of the North Dakota Century Code for pages 9, through 12, page 16, and page 19 (appendix 1). The work performed under this plan is requested to be confidential and not a public record, because it is proprietary in nature and will include research and development, environmental, legal and transmission strategies for the EPP Project. If confidentiality of the strategies and materials is not maintained, then other industry competitors or parties interested in harming the lignite industry could use these strategies to hamper or undermine the viability of existing lignite facilities; or to jeopardize the development of AET projects. The key personnel identified in this document are bound to confidentiality with respect to the work performed under this plan.

The general identification of potential customers and investors, along with their respective marketing strategies is also proprietary information. An out-of-state/industry competitor could very easily take advantage of this information to attract potential investors and power supply purchasers to other states. It is also important that the specific names of customers and investors remain confidential through the contract commitment deadlines

as shown in the project schedule. Specific name publication could open doors that competitors did not know existed.

The engineering study work, if made public, could also serve to undermine the Project's success because it identifies areas of concern and priority that could save potential competitors significant time and expense. Our effort in maintaining the confidentiality of our information is to ensure the AET Participants under contract with the NDIC are not disadvantaged by records maintained by the Lignite Energy Council Project Team. Where possible, strategic study results will be made public, and non-confidential summaries of the project work will be provided.

STANDARDS OF SUCCESS

The project proposal has included work task objectives (See Project Description, above). The EPP Project team will submit periodic reports addressing progress under each of the tasks. Documented accomplishments and progress in each of the task areas will provide a standard of success.