

Annual Lignite Energy Council Education Program

**Grant Submitted by
Lignite Energy Council**

**Principal Investigator
Lignite Energy Council**

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Amount Requested: \$100,000

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ABSTRACT

The objective of the Lignite Energy Council's (LEC) Education Program is to educate teachers, students and members of the general public about career opportunities, economic benefits and operations of the lignite industry.

With support from the Lignite Energy Council's Lignite Education Seminar, education website and other outreach efforts, the expected results of the Education Program include facilitating open communication between the industry and educators, increasing the awareness and understanding of the industry and improved favorability of the industry. Ultimately, a positive public opinion will attract workforce and create interest and awareness of the career opportunities afforded by the North Dakota lignite industry.

In 2014, a period of transition fostered the expansion of the Lignite Education Seminar to an all-encompassing Education Program.

The funding request is for a one-year program. The total budget for the Education Program as described is \$234,000, of which \$100,000 is requested from the Lignite Research Council. The matching funding for the Education Program comes from the Lignite Energy Council and in-kind services from the Lignite Energy Council and representatives of the lignite industry.

PROJECT SUMMARY

The mission of the Lignite Research Council is to assist in marketing as well as research and development activities. The Education Program as outlined in this grant request is an effective way for the Lignite Energy Council to continue to market the industry, its economic benefits and its career opportunities to educators and students in the states of North Dakota, Minnesota, South Dakota and Montana.

Education and public outreach are critical to the future success of the energy industry in our state. Public awareness and support for the value of the industry to the state will be helpful when trying to attract a workforce. Providing educators with an understanding of the lignite industry and related career opportunities will likely provide them with the background knowledge to encourage students to consider the career opportunities in North Dakota's energy industry when they begin to look at career choices.

Attracting a future workforce is crucial as the industry faces a 50 percent retirement bubble in the next few years – both at the mines and coal conversion facilities. Environmental technology improvements that are needed at existing plants and new construction projects in the future will increase the demand for a highly skilled workforce.

The flagship piece of the Education Program is the Lignite Education Seminar. The four-day Seminar, which is held each June, includes tours of mines and coal conversion facilities along with presentations and panel discussions on a number of relevant issues including history, geology, mining and reclamation, converting lignite to electricity, converting lignite to synthetic

natural gas, economics of the lignite industry, career opportunities, environmental challenges, transmission and research and development topics.

Each participating teacher is eligible to receive two graduate credits, paid for by the Lignite Energy Council, from the North Dakota University system (UND, NDSU and Minot State University) upon the completion of the Seminar and submission of a lesson plan. Teachers also receive ancillary information for classroom work including classroom activities, videos about generation, mining and reclamation and samples of coal and coal combustion byproducts.

The Seminar focuses on sending teachers home with practical and applicable information and classroom tools. It places an emphasis on technology and hands-on learning to help the teachers prepare lesson plans.

The 2017 Seminar will be held at the National Energy Center of Excellence on the campus of Bismarck State College in Bismarck, ND, on June 12-15. The annual Seminar has attracted educators from a four-state area – North Dakota, South Dakota, Minnesota and Montana. School superintendents, principals and teachers of all grade levels from elementary to senior high attend the four-day Seminar. Approximately 125-135 educators attend annually.

STANDARDS OF SUCCESS

In 2009, the Education Seminar expanded from a one-credit (two and a half days) to a two-credit (four-day) Seminar. This change required more face-to-face time between instructors and teachers. It also gave the LEC the opportunity to make some capital improvements, such as an electronic Audience Response System, which allows more interactivity between the instructor and the audience.

The Audience Response System has allowed staff to track changes in opinions about the industry, what participants have learned throughout the Seminar and also what they are interested in learning more about.

During the last four Seminars held, a survey of participants has indicated an increase in favorability opinions from the beginning of the Seminar to the conclusion of the Seminar. Additionally, a majority of participants indicated that they will make use of material and knowledge gained through the Seminar when they return to their classrooms.

In 2016, Seminar attendees were asked a series of questions that mirrored a North Dakota and Minnesota public opinion study conducted in 2014. The same questions were asked to attendees before and after the Seminar. The findings following the conclusion of the Seminar were:

- 92.41% respondents said that they favor the use of coal to produce electricity – a 16.46% change.
- 73.33% strongly agreed that coal energy is vitally important to our region's power supply – a 14.67% change.
- 58.97% strongly disagreed that coal is a dirty form of energy and should not be part of our energy future – a 11.54% change.

In the fourth quarter of 2014, the LEC sent out a similar survey to those who attended the Seminar since 2009, when the Seminar expanded to a two-credit program. Here are some notable results from that survey:

- 82% indicated that they have incorporated Seminar information into their teaching plans.
- 73.53% have promoted the job opportunities in the lignite industry to their students.
- 86.1% of the teachers indicated that the subject matter of the Seminar was applicable to the subject matter they teach.
- 70% of attendees indicated that leaning more about the industry was the primary reason for attending.
- 62.10% indicated that receiving two graduate credits was a major factor in their attendance.

A similar study conducted from 2015 and 2016 attendees also indicated that real life examples of why certain subjects are important for energy-related careers was what they felt they learned most about during the Seminar.

North Dakota Energy Activities Trunks

As a result of the findings from the Education Advisory Group, the Lignite Energy Council is collaborating with the State Historical Society of North Dakota to build North Dakota Energy Activities Trunk with Objects (NdEATO). The goal is to produce a product that would be available for school districts to check-out and use in the classroom. Another goal for the product would be something for substitute teachers to have at their disposal when preparation time and/or when their knowledge of the subject is minimal.

The NdEATO trunk contents go hand-in-hand with *Energy: Powered by North Dakota* energy curriculum, a product of the EmPower ND Commission. Additionally, the activities and instruction follow the syllabus of the *Lignite Education Seminar*.

Lignite Education Video Series

As part of our continual improvement efforts, we have been focusing more attention and resources to update and broaden our library of videos that showcase various aspects of the lignite industry. Completed video projects include:

- Allam Cycle
- Miss North Dakota
- Internships

Allam Cycle – This six-minute video provides a history of the lignite industry’s efforts to reduce emissions and increase plant efficiency before explaining how the Allam Cycle works to create a near-zero emissions plant that would produce both electricity and pipeline-quality carbon dioxide. The video also explains the timeline that is necessary for this plant to reach fruition. The purpose of the video is to show that the lignite industry is working on an R&D solution to meet the requirements of the Clean Power Plan, but time and resources are required to meet the target.

Miss North Dakota – Delanie Wiederich, a native of Hazen, North Dakota, and Miss North Dakota 2015, is featured in two videos that talk about the lignite industry’s impact on her

hometown and Mercer County. She further explains how the Clean Power Plan could shut down half of the lignite industry if the state is to meet the 45 percent cut in carbon dioxide emissions by 2030. The purpose of the video is call attention to the harmful effects of the Clean Power Plan both on the state of North Dakota and Coal Country communities.

Interns – Three videos produced this summer show college interns working at the area mines and power plants. The interns talk about career choices and how the right education can prepare them for careers in the lignite industry, a homegrown industry in the heart of North Dakota. The interns also talk about the environmental regulations and how the mines and plants not only comply but beat the standards in place through state and federal regulation. The purpose of the videos is to put a human face on the industry, provide a voice from young people talking about the industry and also inform the public about career opportunities in the lignite industry.

With funding from the 2016 LRC grant, the Lignite Energy Council also began the process to develop new education videos that would pair with the Lignite Education Seminar. When videos were completed 20 years ago, the utilities in the lignite industry would often provide the Lignite Energy Council the video as an in-kind contribution. However, competition and down-sizing in the energy industry has limited if not ended that practice completely. Thus, the LEC must look for the lowest-cost video contractors to rebuild our library.

As part of that process, the LEC has been working with local media company KAT Communications to draft a plan for a series of four 15-minute videos. Phase one of the process has been completed and the proposal has been included as an appendix to the grant application.

Additionally, the LEC has begun the process to update and improve educational materials available to all teachers that will be made available by way of the education website. Materials will include lesson plans for multiple grade levels, hands-on activities and up-to-date workforce information. Through website analytics and follow-up with those who download the material, the LEC will be able to provide facts and figures on their usage.

Lesson Plans

Finally, the Lignite Energy Council is working with local teachers to develop new and revamped lesson plans that would be available for all teachers to utilize. To start that process, the LEC worked with Instructor of Record, Terry Hagen, to identify the top five lesson plans submitted. Teachers at the 2016 Seminar were given a cash award incentive to create their best possible lesson plan. This fall, the Lignite Energy Council will be selecting the first, second and third place lesson plans. First place will be awarded \$100, second \$50 and third \$25. By incentivizing lesson plan submissions, the LEC will have a good pool of lesson plans to draw from for further development and implementation.

BACKGROUND

The Lignite Energy Council has been offering the Seminars since 1986. The Seminar is reviewed by UND faculty member Terry Hagen, who oversees the Seminar as part of UND's School of Business and Public Administration. The coordination of the Seminar is handled by Kay LaCoe,

the Director of Membership Marketing with the Lignite Energy Council. The various presenters work in the industry and speak from experience on their various topics.

More than 3,000 teachers in 600 schools have completed the Seminar and it is estimated that more than 60,000 students receive some education about lignite and its role in the regional economy every year. More than 700 of these teachers were from out of state.

Each year, the Seminar's administrator works closely with recruitment representatives with each of the electric utilities that have customers in targeted states. The Lignite Energy Council provides these recruiters with printed and electronic promotional material. The recruiters are responsible for disseminating the information to schools and teachers within their service territories. Applicants are directed to the Lignite Energy Council's website (<https://www.lignite.com/teachers>) to complete an online application or print and submit a completed form.

In the past, a portion of the recruitment budget has been dedicated to printed material (approximately \$7,200 for 2014). Staff tested additional methods to recruit such as social media ads, direct email marketing and advertisements in school district publications. The goal is to use recruitment money in a more effective method. Research conducted in 2015 indicated that printed material and direct-mail remains the most effective way to recruit.

Recruitment in North Dakota consists of a printed direct-mail piece sent to every licensed teacher in the state. Additional recruitment methods used include a letter and several recruitment brochures sent to every school principal, targeted Facebook advertisements and advertisements in regional trade publications.

Accommodations are made at Bismarck State College to house teachers in dorm rooms on campus. This cost is paid for out of the Seminar budget. Sponsorships are available for transportation reimbursement to and from the Seminar for eligible teachers in Montana, South Dakota, Minnesota and Iowa. North Dakota teachers are responsible for their own transportation costs to and from the Seminar, but are eligible for housing during the Seminar.

The Seminar is open to kindergarten through 12th grade teachers from North Dakota, South Dakota, Minnesota or other states where North Dakota lignite-based electricity is used. Teachers are accepted on a first-come, first-served basis; however, preference may be given to those who teach math, science or social studies.

Seminars held 2013 – 2015 hosted 370 teachers, 261 of which were from North Dakota and 109 from other states such as Minnesota, South Dakota, Montana, Wyoming and Iowa. While participants represented every grade, subject matter and discipline, there is a well-balanced representation of approximately one-third grade school, one-third middle school and one-third high school teachers. Physical and earth sciences, math, and social studies teachers represented a majority of subject-specific teachers, while grade school teachers teaching all subject matters also make up a large portion of participants.

As part of the industry's in-kind contribution, North Dakota and Minnesota cooperatives and investor owned utilities provide sponsorships for out of state teachers to attend. These sponsorships typically cover transportation and meal costs incurred during travel to and from the Seminar. Additionally, industry devotes more than 150 hours for recruitment, activities, Seminar presentations and tours.

As part of the Seminar's expansion in 2009, special consideration was made to add content to the Seminar to heavily stress the job and career opportunities associated with the North Dakota lignite industry. The Lignite Industry Career Choices section was a special addition that features a speaker who not only works as the Energy Career Awareness Program Coordinator for the Bismarck Public School System, but also owns an energy-related company doing business with the lignite industry. Additionally, each presentation has been specifically tailored to highlight specific education requirements or future learning opportunities directly related to current and future workforce needs. Finally, in 2015 a panel dedicated to workforce issues and needs was added to the agenda.

The Lignite Energy Council has also engaged in other educational and promotional opportunities to support and supplement the Education Seminar and the promotion of workforce needs. One example is the North Dakota Energy Tour.

In 2014 and 2015, the LEC and North Dakota Petroleum Council partnered to host the North Dakota Energy Tour. College professors and administrators from North Dakota State University, University of North Dakota, Bismarck State College, University of Mary, Gonzaga University, Texas A&M, Minot State University, South Dakota State School of Mines, and Williston State College participated in a two-day event which included tours of coal and oil facilities and presentations from industry personnel. The objective of the Energy Tour was not only to educate participants about the industries, but also to promote workforce opportunities within the industries.

Finally, the LEC has established a charitable 501(c)(3) organization. The primary goal of the Lignite Energy Foundation is to raise funds to support education and scholarship programs for students and teachers in the Upper Midwest who are served by coal-based electricity. The Foundation will provide funds for educational programs and activities which educate about the coal industry, processes, and economic impact; promote industry-related career opportunities; and aim to facilitate opportunities to actively engage students with the industry.

QUALIFICATIONS

The Lignite Energy Council will be responsible for managing the Seminar. The Lignite Energy Council is a regional trade association representing the interests of producers and users of lignite and conducts programs in four separate areas including: government action; research, development and marketing; education; and public relations. Through these programs, the Council seeks to maintain a viable lignite industry and enhance development of North Dakota's abundant lignite resources in a clean, economical and efficient manner. These programs provide timely, accurate information that enables elected officials, government leaders and the public to make sound, informed decisions on lignite issues.

Representatives of the Lignite Energy Council who also serve as presenters at the Seminar include:

Jason Bohrer serves as President and CEO of the Lignite Energy Council. He also serves as the Chairman of the Lignite Research Council (LRC) which includes government, research, environmental and industry representatives. The LRC assists with development and administration of North Dakota's Lignite Research, Development and Marketing Program by providing recommendations to the Industrial Commission.

Mike Jones is the vice president of research and development for the Lignite Energy Council and is the technical advisor to the North Dakota Industrial Commission. Jones has been senior research advisor at the Energy & Environmental Research Center and an adjunct professor of physics at the University of North Dakota. He received his Ph.D. and M.S. in physics at the University of North Dakota and his B.S. in physics from Bemidji State University. A Minnesota native, Mike joined the Lignite Energy Council in 2009.

Kay LaCoe serves as the Director of Membership Marketing for the Lignite Energy Council. Kay has a Bachelor of Science Degree in Business Communications from the University of Mary. She worked extensively with the Seminar since 2008 prior to assuming the role of the Seminar's facilitator in 2014.

In addition to Lignite Energy Council staff, the LEC relies on the expertise provided by industry and education representatives to provide the bulk of instruction for the Seminar. The proposed speaker slate is included as an appendix to the application.

VALUE TO NORTH DAKOTA

The North Dakota Legislature has a long history of supporting the lignite energy industry. Specifically, the North Dakota Legislature has enacted legislation which "... declares that it is an essential government function and public purpose to assist with the development ... of North Dakota's vast lignite resources ... 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 ..."

The lignite energy industry is vital to North Dakota's economic health. The industry comprises four percent of the states' total economic base. Annual lignite production has been approximately 30 million tons since 1988, making North Dakota one of the 10 largest coal producing states in the nation. In 2014, an NDSU economic study showed that 4,000 North Dakotans are directly employed in the lignite industry and another 12,000 indirectly. The industry is expected to generate almost \$3.4 billion in annual business activity, as well as \$97 million in annual state tax revenues.

This Seminar project is part of the larger LEC mission which seeks to:

- 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 North Dakota's lignite industry for the general welfare of North Dakota.

MANAGEMENT

The Lignite Energy Council will manage and oversee the Seminar and its Board of Directors has authorized the program and budget. Kay LaCoe, Director of Membership Marketing, is the primary person responsible for the Seminar. Kay reports to Jason Bohrer, President and CEO of the Lignite Energy Council. The University of North Dakota, North Dakota State University and Minot State University have approved the program for eligibility of two graduate credits for the Seminar.

TIMETABLE

The Lignite Energy Council's Teacher Education Seminar described in this grant request runs from January 1, 2017, through December 31, 2017.

BUDGET

The Lignite Energy Council's Teacher Education Seminar annual budget, including in-kind services, from January 1, 2017, through December 31, 2017 is \$234,000 (See page 12).

MATCHING FUNDS

The Lignite Energy Council and its members will provide in-kind services and funding of at least \$100,000 for one year to match the Industrial Commission's funding of \$100,000 for one year. Total funding requested for the one-year period is \$100,000, which will be matched by the Lignite Energy Council and its members.

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.

CONFIDENTIAL INFORMATION

No confidential information is included in this proposal.

Appendix

- Proposed Budget
- KAT video production proposal
- Presenter credentials

Jason Bohrer, President & CEO
Lignite Energy Council