

**BASIN ELECTRIC  
POWER COOPERATIVE**

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March 1, 2007

Ms. Karlene Fine  
Executive Director  
North Dakota Industrial Commission  
ATTN: Oil and Gas Research Program  
State Capitol, 14th Floor  
600 East Boulevard Avenue  
Bismarck, ND 58505

Dear Ms. Fine:

Enclosed are the original, one hard copy and an electronic copy of the proposal "Energy and Transmission Needs Analysis on North Dakota Oil & Gas Development." Also enclosed is the \$100.00 application fee.

Basin Electric is requesting funding assistance from the North Dakota Industrial Commission due to the potential positive impacts from the state's new upsurge in oil and gas development. An accurate analysis of the magnitude and timing of this new load is essential for Basin Electric to begin planning and building the necessary generation and transmission infrastructure to serve this new demand.

If you have any questions or comments, please contact me by phone at (701) 224-5392 or e-mail at [draatz@bepc.com](mailto:draatz@bepc.com).

Sincerely,

A handwritten signature in blue ink that reads "David D. Raatz". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

David D. Raatz  
Manager, Marketing and Power Supply Planning

cj/kz  
ENCLOSURE



**Grant Application  
for a  
Energy and Transmission Needs Study on  
North Dakota Oil Development**

**Presented to:**

Ms. Karlene Fine, Executive Director  
North Dakota Industrial Commission  
600 East Boulevard Avenue, Dept. 405  
Bismarck, ND 58505-0840

**Submitted by:**

Dave Raatz, Manager of Marketing and  
Power Supply Planning  
Basin Electric Power Cooperative  
1717 East Interstate Avenue  
Bismarck, North Dakota 58503

**Funds Requested from  
the North Dakota  
Industrial Commission:  
\$ 98,000**

**Principal Investigator:**  
Pace Global Energy Services, LLC

February 28, 2007

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## **ABSTRACT**

The overall objective of the proposed project is to perform an analysis of oil development activities in the Williston Basin and to determine the implications these activities may hold for power demand and power delivery. The analysis will evaluate oil drilling plans, develop oil pumping load curves for major formations of the Williston Basin, analyze oil recovery techniques, determine pipeline capacity, outline major environmental issues and identify other potential oil development.

There is a resurgence of oil exploration and production activity in the Williston Basin. Requests for significant incremental power supply are coming to Basin Electric's members. The expected result of this analysis is to get an accurate determination of the size, load shape and longevity of the new oil and gas-related load. This is critical for the immediate and long-term generation and transmission planning and construction.

The construction of new generation and transmission resources or the upgrading of existing resources requires extensive lead time so knowledge of the potential electricity demand requirements is crucial for Basin Electric to determine the facilities needed. Basin Electric does not want to under/over build the necessary resources to serve the additional oil development. The oil field operators are seeking the necessary power supply at affordable rates and Basin Electric and its members are seeking to serve its customers reliably and at minimum costs. Building only the resources necessary will save both oil field operators and Basin Electric and its member's significant capital, operating and maintenance costs.

The three month analysis will be done by Pace Global Energy Services, LLC (Pace Global) for Basin Electric and its members, North Central Electric Cooperative, Inc., Mountrail-Williams Electric Cooperative, Slope Electric Cooperative, Inc, McKenzie Electric Cooperative, West Plains Electric Cooperative and Burke-Divide Electric Cooperative, Inc. at a cost of \$201,600.

## PROJECT DESCRIPTION

Pace Global will perform an analysis of oil development activities in the Williston Basin. The objectives of the analysis are to determine the probable magnitude and timing of future peak load and annual power requirements associated with oil and gas exploration and production activities for use in Basin Electric's resource planning.

Pace Global will develop a methodology for critically reviewing power supply requests and forecasts, place them in the context of the total potential load and aggregate them by geographic location using consistent economic assumptions. Pace Global will then extrapolate these forecasts another ten years to define a long-range planning environment for system expansion. The process Pace Global will undertake in the analysis:

### Interviews

- Pace Global shall arrange for and conduct the following confidential interviews:
  - Oil Producers. Interviews with at least the top ten oil producers and developers in the service area, both with field office managers and, as required, with corporate planning executives in their headquarters. Pace Global will interview individuals in both regional and corporate offices because they will have different perspectives.
- Pace Global shall arrange and conduct up to 20 face-to-face interviews with the entities listed above and provide at least one-week notice to Basin Electric so it may attend the interviews. Interviews that cannot be done face-to-face shall be done by phone.
- Pace Global shall prepare a general outline of questions and information that is expected to be gained from the interviews. The questions will focus on developing a market view on the future of oil development in the Williston Basin and the power load requirements of that development. Key topics will include: drilling plans, well production curves, production and development cost assumptions and drilling permit processes.

- Interview questions shall facilitate discussion to allow Pace Global to assess drilling plans, methods of recovery, total resource potential and market share related questions in order to quantify load.
- Pace Global shall begin setting up interviews as soon as is practicable after execution by both parties of an agreement. Until the execution of the final contract, Basin Electric has signed a letter of commitment, so that Pace Global can begin the analysis immediately.
- Upon completion of all the interviews, a short confidential report shall be prepared summarizing the key issues and overall conclusions obtained through the process within 2 weeks. This report will include a preliminary comprehensive view on the projected power load forecast and will be sent to Basin Electric.

### **Load Forecast Model and Inputs**

Pace Global shall perform an assessment of the Williston Basin oil development and develop an econometric spreadsheet model on the development of hot plays in the service area. At a minimum this will include development in the Tioga, Bowman and Belfield areas. The independent input assumptions to this model shall include the following:

- **Drilling Activity.** Pace Global shall evaluate, assess and forecast the number of new oil wells to be drilled in each of the identified formations in the Williston Basin for the 20 year period. From the interviews, Pace Global will determine the completion and operating costs of new wells in each of the major identified formations.
- **Power Requirements.** Pace Global shall develop qualitative oil production type curves to identify pumping loads for a well in each of the identified major formations of the Williston Basin. Pace Global will **not** perform any reservoir modeling.
- **Well Life-Cycle.** Pace Global will identify the characteristic life-cycle well operating profile for each formation and recovery technique (primary, secondary, tertiary), as well as the amount of power required for each stage of the life-cycle, the number of wells (as a

percentage) that are currently using secondary and tertiary recovery methods and the length of time that such methods can be used.

- **Recovery Factor.** Pace Global will determine a reasonable high, medium and low oil recovery factor for each formation from the interviews and aggregate such information to provide Basin Electric a comprehensive view of the Williston Basin.
- **Oil Price Forecasts.** Pace Global will provide an independent high, medium and low regional oil price forecast for the 20 year forecast period.
- **Pipeline and Refinery Capacity.** Pace Global will determine the ability for the existing infrastructure to adequately move oil to regional refineries and other export market hubs. In addition, Pace Global will obtain information on new projects and identify their potential power load requirements.
- **Environmental.** Pace Global will identify major environmental concerns or threats to the future of oil development in the Williston Basin.
- **New Technologies.** Pace Global will research, to the extent possible, new technologies that could impact oil development.
- **Miscellaneous.** Pace Global will identify, if applicable, other potential oil development issues that could affect future power load.

### **Scenario Development and Forecast Model Input Assumptions**

**Total Load:** Pace Global will develop three scenarios; low, most likely (base), and high case annual load forecast projections using all relevant information and inputs to determine total oil development-related electrical load forecasts (energy and demand) by year without losses for 20 years. The first ten year forecast will reflect implementation and limited extension of the current development plans of basin operators and a projection of oil and gas production from existing wells, including the impact of any planned secondary and tertiary enhanced oil recovery. The second ten year forecast will extrapolate on the ten-year outlook to define a long-range planning environment for system expansion. The service

area forecast shall consider and include all electrical power requirements, regardless of who would supply such loads. Pace Global will attempt to render opinions on the probability that certain electric loads will occur.

- Timing and Forecast of New Power Supplies. The timing for Basin Electric to deliver power to this region is critical and must be considered in relation to the timing of the demand for such power in the region.

### **Deliverables**

- Conference Calls. The member cooperative and Pace Global will participate in conference calls if deemed necessary by Basin Electric.
- Confidential Summary Reports for Interviews. One to two-page summaries will be prepared after each interview identifying hot plays and a qualitative long term load projection.
- Preliminary Results and Final Report. Pace Global shall provide Basin Electric all preliminary model (including formulas and values) computations of procedures used to develop the conclusions as well as the final report. The final report shall not contain any confidential information so that it could be distributed to the public.
- Presentations. Pace Global shall prepare for and present in person two final forecast presentations to be identified by Basin Electric at dates and times to be selected by Pace Global and Basin Electric. Pace Global shall be prepared to discuss and defend any and all assumptions and considerations in the forecast. In addition, Pace Global will prepare and deliver presentations to the North Dakota Industrial Commission and guests if desired.

## STANDARDS OF SUCCESS

The expansion of the oil and gas development is directly dependent on the availability of electricity to power oil wells, secondary oil recovery, oil pipelines and related industries. The dramatic increase in electrical load means that additional generation and transmission infrastructure is needed on an expedited timetable. Building the necessary transmission infrastructure will strengthen the intrastate grid in North Dakota and provide construction jobs. Generation needs might be met with current base load capacity and distributed generation, however, dependent on the magnitude and longevity of load requirements, additional coal-based generation may become necessary. Basin Electric is a partner with Minnkota Power Cooperative, Inc. in the development of the "Milton R. Young 3 Project", a new lignite-based power plant. Basin Electric also has the "Leland Olds 3 Proposal" as a possible new resource to be built to accommodate increasing Basin Electric load. Both of these projects would be built in North Dakota and use lignite coal.

North Dakota ranks 9<sup>th</sup> among the nation's oil producing states with production of 113,000 barrels per day. With over 3,600 wells capable of production and expanding, it is essential that the electricity demand is met to further this development. The 2005 oil tax revenues of \$153 million, a 63 percent increase from 2004 are substantial to the state of North Dakota. An expanded oil and gas base will further enhance the revenues to the state. These revenues are sent to counties, schools, cities and fund several trusts including the Permanent Oil Trust fund, Resources Trust fund, Oil Impact Grant fund, Oil and Gas Research Council and the Foundation Aid Stabilization fund.

The oil and gas expansion translates into more jobs in North Dakota. Today North Dakota has about 34 rigs drilling in North Dakota and each drilling rig results in approximately 120 direct and indirect jobs. Obviously with the increased price of crude oil, exploration in North Dakota will continue as long as crude prices remain relatively high.

## **BACKGROUND/QUALIFICATION**

### **Basin Electric Power Cooperative**

Basin Electric is a consumer-owned, regional cooperative whose core business is generating and delivering electricity to wholesale customers, primarily our member systems. In North Dakota, Basin Electric provides wholesale electricity to Upper Missouri G & T Electric Cooperative, Inc. and Central Power Electric Cooperative, Inc. who distribute the electricity to their North Dakota distribution cooperative members. The distribution cooperatives affected by the oil and gas development include Burke-Divide Electric Cooperative, Mountrail-Williams Electric Cooperative, McKenzie Electric Cooperative, Inc., West Plains Electric Cooperative, Inc., North Central Electric Cooperative, Inc. and Slope Electric Cooperative, Inc. These cooperatives have been serving the oil loads from the very beginning of oil development in North Dakota.

Basin Electric owns two coal-based generating plants in central North Dakota, the Antelope Valley Station and Leland Olds Station.

### **Pace Global Energy Services, LLC**

Pace Global Energy Services, LLC has been in business for over 25 years providing independent and objective energy consulting, procurement, and risk management services in over forty countries on six continents. Pace Global provides expert support to energy developers, financial institutions, public utilities, commercial and industrial consumers, and public sector agencies.

Pace Global provides strategic and technical expertise in fuels, electric power, finance, risk management, and energy management in both domestic and international energy markets. The Pace Global team of industry professionals consists of MBAs, engineers, economists, systems operations specialists, and political and regulatory specialists representing diverse nationalities and backgrounds.

## MANAGEMENT

Given the scope of services included in the engagement, Pace Global proposes a team structure that includes an Officer-in-Charge, a day-to-day project manager and functional expert support. Jim Diemer will act as the Corporate Officer-in-Charge of the engagement and will assure that the appropriate resources are deployed in a timely fashion to meet Basin Electric requirements. Mr. Diemer is Vice President and Managing Director of Pace Global's Fuel, Environmental, Regulatory and Expert Services ("FERES") Division and within this division he has over 40 professionals with expertise that is relevant to this effort. These senior experts leverage a pool of over 20 analysts in the FERES Division to effectively and efficiently conduct the required work scope. Additionally, Mr. Diemer will be able to draw upon, on an as-needed basis, 30 other senior professionals from other divisions of Pace Global.

Greg Ballheim will act as the day-to-day project manager. Mr. Ballheim is a manager in Pace Global's FERES Division specializing in natural gas, crude oil, and petroleum products markets. He is responsible for managing projects in domestic and international markets by conducting a number of analyses for multiple fuels and power, including fuel procurement strategies, tariff research, supply/demand assessments, crude oil and petroleum product price forecasting, feasibility studies, backup oil analyses, bank financing due diligence, fuel supply and transportation agreement review, and basis analysis.

Pace Global has performed coal bed methane load forecasts for the last 6 years on the Powder River Basin for Basin Electric's Wyoming members. Basin Electric believes it has established a good working relationship with Pace Global. Bill Cudworth, Sr. Forecast Analyst at Basin Electric, will be the contact person on a day-to-day basis for the work with Pace Global. Dave Raatz, Manager of Marketing and Power Supply Planning at Basin Electric, will use the analysis and work with the generation and transmission departments of Basin Electric and member cooperatives to develop an integrated resource plan to address the needs to serve the oil and gas development.

## TIMETABLE

A targeted timetable for the Pace Global analysis:

March – April 13, 2007	Interviews with oil producers, government agencies, pipeline companies, technology providers and others
April 13-27, 2007	Process data
April 27, 2007	Preliminary draft of power load
April 27- May 4, 2007	Response time for the preliminary and written draft
May 7-8, 2007	PowerPoint Presentation
May 11, 2007	Final Forecast Report with associated electronic files

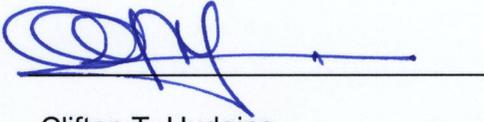
## BUDGET

This proposal is to request a \$98,000 cost share from the Oil and Gas Research Council and the North Dakota Transmission Authority to conduct the analysis. The impact from oil and gas development needs to be quantified to determine what additional generation and transmission resources will be necessary to sustain this development. If less funding is available, Basin Electric is still committed to fund the analysis.

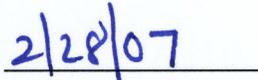
<b>Task</b>	<b>Labor Fees</b>
Preparation & Kick-off Meeting	\$ 5,000
Interview Set-Up, Meetings & Reports	\$ 89,000
Preliminary Analysis & Summary Report	\$ 18,000
Final Report & Forecast	\$ 46,000
Two Presentations (Cooperative boards)	\$ 10,000
Presentation to NDIC if desired	\$ 5,000
Travel	\$ 16,000
General & Administrative Fee	\$ 8,600
<b>Total</b>	<b>\$ 201,600</b>

## TAX LIABILITY

I, Clifton T. Hudgins, certify that Basin Electric Power Cooperative does not have any outstanding tax liability owed to the State of North Dakota or any of its political subdivisions.



Clifton T. Hudgins  
Senior Vice President  
Chief Financial Officer



Date

## CONFIDENTIAL INFORMATION

The final report analysis and its findings will be public information.

## PATENTS AND RIGHTS TO TECHNICAL DATA

No patent rights to technical data are anticipated.

## **APPENDIX A**

### **Resumes of Key Personnel**

#### **Pace Global**

##### **Gregory (Greg) Ballheim**

**7+ Years: Natural Gas and Petroleum**

Mr. Ballheim is a Manager in Pace Global's Fuel Market Strategies specializing in natural gas, crude oil, and petroleum projects markets. He is responsible for managing projects in domestic and international markets by conducting a number of analyses for multiple fuels and power, including fuel procurement strategies, tariff research, supply/demand assessments, crude oil and petroleum product price forecasting, feasibility studies, backup oil analyses, bank financing due diligence, fuel supply and transportation contract review, and basis analysis. Mr. Ballheim interfaces with commodity and transportation suppliers in the marketplace being responsible for conducting RFP's (request for proposal) and leading negotiations for clients' long-term supply. In leading negotiations for clients he works with senior management teams to provide analysis of proposals, fuel planning and optimization, operational activity reporting, budget reporting and planning, regulatory monitoring and other contractual obligations on behalf of the clients.

##### **James (Jim) Diemer**

**20+ Years: Natural Gas, Coal and Power**

Mr. Diemer has played a leading role in numerous domestic and international projects for energy infrastructure developers. He has developed strategic supply plans, represented large energy consumers in contract negotiations, and provided energy management services. Mr. Diemer has supported an economic and market analysis of CO<sub>2</sub> tertiary oil recovery in the Southwest region. He has managed the development of natural gas pipelines and negotiated long-term commodity and transportation contracts, as well as pipeline interconnection and header system agreements. He has developed fuel procurement and management plans for over 2 Bcf/d of natural gas demand in North America for power plants and large industrial facilities. With experience in natural gas, LNG, coal,

petroleum products and electricity, he brings a strong market perspective to his engagements. Mr. Diemer has contributed to regulatory filings and developed questions for cross-examination of witnesses related to energy market certification requirements, data information filings, universal service funds, and transition costs. He has been an expert witness of North American gas industry standards for nominating and scheduling natural gas on interstate pipelines. He has also been deposed in a gas supply contract dispute.

### **Basin Electric**

#### **Bill Cudworth**

#### **33+ Years: Oil and Gas Revenue and Load Forecasting**

Mr. Cudworth's experience includes: ten years of Williston Basin oil and gas revenue forecasting for the state of North Dakota, twenty three years oil and gas load forecasting for Basin Electric Power Cooperative on oil loads in Montana, North Dakota, Wyoming and South Dakota for the Williston Basin and other smaller basins and six years forecasting and working with Pace Global Energy Services in forecasting coal bed methane loads for the Powder River Basin in Wyoming. He has considerable contact with the oil and gas industry and has used various oil and gas data bases and computer software. He also has developed many econometric oil load forecasting models and has been working with local cooperatives for 23 years assisting in their oil and gas load forecasts.

#### **David Raatz**

#### **27+ Years: Electric Utility Industry**

David Raatz, Manager of Marketing and Power Supply Planning at Basin Electric is responsible for directing forecasting of Basin Electric's member load levels; non-member marketing, contract negotiations, and contract development; power scheduling and power system coordination; accounting of utility power; and is involved in all aspects of Basin Electric's power supply planning activities. He serves as Chairman of Basin Electric's Contract Review Committee, which ensures contract compliance, and is on Basin Electric's Return on Investment Committee. Dave graduated from North Dakota State University with a Bachelor of Science degree in electrical engineering and has 27 years of experience in the electric utility industry.