



# NARUC

National Association of Regulatory Utility Commissioners



Request for Proposals to assist the Eastern Interconnection States' Planning Council (EISPC) Members with Identification of State-by-State Existing and Potential for:

## **STUDY 7: Assessment of Coal Potential (including Carbon Capture and Storage)**

**Solicitation Number: NARUC-2011-RFP005-DE0316**

**RELEASED: September, 20 2011  
RESPONSES DUE: October 21, 2011**

Grants & Research Department  
National Association of Regulatory Utility Commissioners  
1101 Vermont Avenue NW, Suite 200  
Washington, D.C. 20005

**REQUEST FOR PROPOSALS TO ADDRESS**  
**STUDY 7: ASSESSMENT OF COAL POTENTIAL (INCLUDING CARBON**  
**CAPTURE AND STORAGE)**

**A. Introduction**

The Eastern Interconnection States' Planning Council (EISPC) represents the 39 states, the District of Columbia, and 8 Canadian Provinces located within the Eastern Interconnection electric transmission grid. This is the first time in the nation's history that these entities will be working together, supported by a funding opportunity from the United States Department of Energy, to evaluate transmission development options throughout the Eastern Interconnection.

NARUC/ Eastern Interconnection States' Planning Council issues this Request for Proposal (RFP), to enable EISPC Members to address immediate and long-term resource issues and opportunities within the Eastern Interconnection. The analysis will provide information to EISPC members and will also serve to inform longer-term modeling analysis. EISPC's expectation is that the analysis will be comprehensive.

NARUC will issue subcontract(s) under Recovery Act DE-OE0000316 , to secure the services of a Subcontractor(s) to provide assistance to States.

The Subcontractor(s) is expected to work collaboratively with EISPC Staff and Members in all aspects of the analysis and in the preparation of reports to assure the information is as useful as possible to EISPC members. EISPC anticipates the Subcontractor(s) will require some assistance from EISPC members to complete the analysis. The Subcontractor(s) is also expected to coordinate their efforts to those of the Department of Energy's National Laboratories (please see D. Draft Statement of Work below) and other work being done by the National Laboratories (including on-going studies, Energy Zones - GIS work, and etc). The work product will be in the Public Domain.

**B. Department of Energy Requirements**

The study will be undertaken under Department of Energy agreement DE-OE-0000316, funded under the American Recovery and Reinvestment Act of 2009 (ARRA). Respondents must be able to comply with the provisions of ARRA and the core funding agreement with regards to transparency, reporting, financial management, lobbying exclusions, and other areas. This RFP requires the subcontractor(s) to include on their SEFA information to specifically identify Recovery Act funding. This information is needed to allow the NARUC to properly monitor subcontractor(s) expenditure of ARRA funds as well as oversight by the Federal awarding agencies, Offices of Inspector General and the Government Accountability Office.

**C. Period of Performance**

The period of performance for these awards will be November 2011 through no longer than December 13, 2012; unless approved by EISPC/NARUC and DOE. It is anticipated that successful Subcontractor(s) will be notified in November 2011.

**D. Funds Budgeted**

\$250,000 has been budgeted for this effort. However, NARUC / EISPC reserves the right to alter this amount depending on the Responses and to ensure that other EISPC priorities are satisfied.

**E. Responding to the RFP**

Please submit State responses to the RFP to Miles Keogh, NARUC's Director of Grants and Research, by email to [mkeogh@naruc.org](mailto:mkeogh@naruc.org) and Bob Pauley [bob.pauley@eispc.org](mailto:bob.pauley@eispc.org) with the email subject **STUDY 7: Assessment of Coal Potential (including Carbon Capture and Storage)**

Please your response no later than October 21, 2011. There is no specific limitation on page numbers or format, although brevity and completeness will aid the selection process. All questions regarding the RFP should be directed to Miles Keogh and Bob Pauley by email as well. In responding to this RFP, the Subcontractor(s) must respond to the following sections:

- Discussion of Subcontractor(s) recommended approach to addressing the RFP. EISPC has provided a proposed Scope of Work (contained herein). However, the Subcontractor(s) is expected to recommend the types of information required (ideal and currently available), clarifications, recommendations for future work including databases / analysis / equipment / and etc., and propose modifications to the Scope of Work with attendant rationales.  
Even if the ultimate Scope of Work proposed by the Subcontractor(s) is not fully approved by EISPC / NARUC, those additional areas of investigation may be included in subsequent Requests for Proposals issued by NARUC / EISPC.  
The Subcontractor(s)'s response should also reflect the work being done by the National Laboratories, the Energy Information Administration, and others to ensure there is no undue duplication of effort.
- Proposed methods to collaborate with EISPC members, coordinate work with the Energy Zones Workgroup, and the National Laboratories. This shall include expected general information to be obtained from EISPC members and to facilitate the work of the National Labs.
- Provide an initial list of some of the resources (e.g., Department of Energy, Energy Information Admin., etc) you intend to build upon and a cursory discussion of the potential enhancements that you (your firm) offer.
- The Response shall contain detailed timelines / milestones with deliverables. This should include obtaining the information required of each state, Planning Authority, utility, power plant developer, and etc.

- Statement of Qualifications and work experience for each of the Subcontractor(s)'s Staff on topics similar to those in this RFP. The Subcontractor(s)'s response should include examples of relevant Work Products (web links are sufficient).
- Sub-Contractors should be provided with their Qualifications, examples of work product, and their expected contribution to the deliverables, and contract amounts.
- Identification of primary contact and their contact information.

*Please be advised in order to comply with the lobbying restrictions of the core funding agreement from the Department of Energy no proposal may be intended to support lobbying efforts of any kind (including advocating specific outcomes of federal agency regulatory activities) or be proposed with any of the aforementioned activities in mind.*

**1. Subcontractor(s) Selection Proposal**

EISPC / NARUC will select a Subcontractor(s) (s) through a competitive selection.

**2. Budget Estimate**

Subcontractor(s) must identify the total costs and should provide a budget estimate of the cost-components expected for this analysis. Cost categories in this budget estimate should include labor, travel, and other direct costs (such as supplies, printing, other expenses.), and costs of sub-Subcontractor(s).

An example table that may be useful in responding to this RFP follows. Respondents may use any budget format they prefer.

<b>Subcontractor(s) Labor</b>			
	Hours	Rate	
Name of Principal / Senior Subcontractor(s)			
Name(s) of Junior Subcontractor(s) (other categories as necessary)			
<b>Total Labor Cost Estimate</b>			<b>\$</b>
<b>Other Direct Costs</b>			
Travel to EISPC Meetings	(trips)	(cost)	\$
Printing of Interim and Final Reports	(documents)	(cost)	\$
Communications (such as conf. calls)			\$
Other (identify other costs is necessary)			\$
<b>Total Other Direct Costs</b>			<b>\$</b>
<b>Total</b>			<b>\$</b>

**D. Scope of Work**

## **STUDY 7: Assessment of Coal Potential (including Carbon Capture and Storage)**

### **INTRODUCTION**

This Study is intended to provide the Eastern Interconnection States Planning Council (EISPC) Members with accurate, comprehensive, and timely information to assist EISPC and its members with formulating resource policies. The Study is not intended to be an advocacy paper for coal technologies. Rather, the paper will objectively discuss various coal technologies in the context of the demand for electricity, diversity of resources, and environmental requirements. In this regard, the Subcontractor(s) is expected to coordinate work with EISPC's Energy Zones effort. This paper should be considered as a foundational resource for future modeling efforts. States, because of their familiarity with the coal units serving their state and their ability to acquire information from jurisdictional entities, may need to assist the Subcontractor(s) in obtaining some of the information.

The Subcontractor(s) is expected to build on the research and information that has been assembled and to provide substantial added value. The Subcontractor(s) shall include the work done by the Department of Energy (DOE –including, but not limited to, NETL and EIA. This GIS work is a prime example), Environmental Protection Agency (EPA), Federal Energy Regulatory Commission (FERC), National Electric Reliability Corporation (NERC), National Association of Regulatory Utility Commissioners (NARUC), National Regulatory Research Institute (NRRI), Electric Power Research Institute (EPRI), trade associations such as Gasification Technologies Council, Architectural and Engineering firms with expertise in coal generation, vendors that build coal equipment, universities, and states. The Subcontractor(s) shall include empirical information from the two IGCC plants in Indiana, the proposed facility in Mississippi, recent environmental upgrades, plant-life extensions, and retirements of coal-fired generating capacity.

### **BACKGROUND SECTION**

- Brief history of the use of coal in the electric industry types /characteristics of coal in the U.S.
- Brief discussion of the evolution of coal-fired generation
- Brief coal gasification history
- state-by-state detail of the following with aggregation to the relevant region:
  1. Coal-fired generating units (numbers, size in MW, type of technology, fuel source, age of units, environmental upgrades) for electric utilities and independent generators.
  2. Coal generating units for industry, universities, and other.
- Historical (perhaps the last 30 years) and current fuel mix by state, region, Eastern Interconnection, and Nation.
- Historic and future demand for coal (domestic and world-wide)use results from modeling.
- Historic and forecasted cost of electric generation from coal-fired power plants.

- Coal resources –Economically recoverable reserves (for the primary types of coal resources such as bituminous, sub-bituminous, and lignite) and characteristics (e.g., sulfur content, heat rates). This should include the ramifications of coal shale and natural gas.
- The demand for coal is, in part, a function of the demand for other resources. As a result, the Subcontractor(s) shall include a brief explanation of the risks and concerns involving other resources would be helpful to EISPC: (a) Hydro-Electric, (b) Natural Gas, (c) Nuclear, (d) Renewable Resources – Biomass, Geothermal, Hydro-Electric, Solar, Wind.
- Brief history of environmental regulation and control technologies.
- Brief discussion of transportation issues in coal – including the economics of transportation.
- Geological and locational issues (including the use of GIS for coordination with the Energy Zones work) for storage and for pipelines to transport carbon dioxide.

### **ENVIRONMENTAL POLICY CONCERNS**

The Subcontractor(s) shall provide a discussion of current and potentially increasingly stringent environmental requirements including potential carbon regulation (i.e., Waxman-Markey, the Administration’s proposals for clean energy, coal waste issues, and mining regulations). In this regard, the Subcontractor(s) should include a discussion of the potential estimated costs and potential ramifications for the coal industry.

### **ASSESSING COAL TECHNOLOGIES**

For each of the following technologies, the Subcontractor(s) shall provide estimated capital costs per kW as well as Variable Operations & Maintenance expenses. The analysis shall also include a framework for states to consider in the evaluation of constructing these facilities and to identify any barriers to achieving a reasoned analysis of the long-term benefits and costs of the various technologies (including the planning horizon, learning rates, and etc.). To the extent there are empirical examples, those should be included as well (e.g., name of unit, size, technology).

- Subcritical, Supercritical and Ultra-Supercritical Pulverized Coal
- Circulating Fluid Bed (CFB)
- Biomass co-firing
- Coal to Synthetic Natural Gas as fuel for NGCC (especially where there are pipeline concerns or if price of natural gas increases)
- Integrated Gasification Combined Cycle (IGCC)
- Chemical Looping Combustion (CLC)
- Comparing Coal Technologies and Incorporating CO2 Capture

### **ENVIRONMENTAL RETROFITS AND RETIREMENTS**

The Subcontractor(s) shall prepare a policy guide for states to assess the cost-effectiveness of environmental retrofits, plant-life extensions, and retirements for utility and merchant owned generation. The information should augment the information in the Background Section and include other types of information that would be considered in evaluating the benefits and costs to changes in coal-fired generating capacity.

- Name and type of unit(s), existing control technologies
- Name plate capacity (other capacity information such as capacity at time of system (e.g., RTO) maximum demand, environmental derates such as those due to water temperatures and attainment zone requirements,
- Capacity factor, unit availabilities, heat rates, and other relevant operational / reliability indices for each of the last 10 years,
- Generic cost estimates for environmental retrofitting and plant life extension

## **CARBON CAPTURE AND STORAGE – Technological, costs, and regulatory issues**

### Carbon Capture Technologies

- Pre-combustion capture
- Oxygen-combustion
- Post-combustion capture
- Absorption (Solvent Scrubbing) Adsorption
- Cryogenic Separation
- Membrane Separation

### Carbon Storage

- Enhanced Oil Recovery (EOR)
- Deep Saline Formations
- Un-minable Coal Seams
- Potential of Worldwide and US Geologic Formations for Storage of Carbon
- Site Selection Criteria for Geologic Storage of Carbon and Energy Zones
- Research Projects Investigating CO<sub>2</sub> Technologies and Storage
- Storage Siting and Permitting for production, carbon capture, storage / transport.

## **RISK AND LIABILITIES**

- State-by-state survey of incentives / disincentives for coal-fired capacity. The incentives and disincentives should include an appendix of statutory provisions and regulatory practices that allow (or prohibit) “Construction Work in Progress (CWIP),” “Allowance for Funds Used During Construction (AFUDC),” “pre-approval,” siting (i.e., some states have moratoriums or siting restrictions) processes that are either streamlined or unduly cumbersome, the capital intensity of clean-coal may restrict merchant generators and others, and etc.
- To what extent do Regional Transmission Organizations or other Planning Authorities, facilitate or inhibit the planning and development of coal-fired generating resources? This could include, but not be limited to, transmission planning that is sufficiently long-term to accommodate very capital intensive projects such as clean-coal generation, the appropriateness of the planning process, the functions of the capacity markets, dispatch practices (including the implications for integrating wind, access to broad markets to buy and sell power, capacity factors and other operational / reliability indices), coordination with states in the

planning / siting/ construction / and operations of coal-fired capacity, and etc.

- Permitting processes for coal-fired capacity (i.e., moratoriums / prohibitions that would impede the development of any new coal-fired facilities, etc)
- Legal and regulatory issues involved with permitting CO2 storage and pipelines
- The economic and engineering feasibility / requirements of CO2 pipelines under a variety of scenarios for locations of potential pipelines. This should incorporate relevant work of the National Labs including GIS in large part related to the Energy Zones work.
- State by state treatment of the legal and regulatory issues related to Carbon Capture (access to spore space, property rights, long term liability and etc.). The potential for something similar to the Price-Anderson Act to limit liability for clean-coal facilities.
- Commentary on the potential for changes in political philosophies that might result in changes in the viability of nuclear power. Commentary of the characteristics that may make a developer / operator more successful in the siting and operations of a nuclear power plant, This is not intended to be a critique of any specific company or the practices of any specific company. Rather, EISPC desires a general description of actions that some companies have taken that may enhance public acceptance and expedite construction of nuclear facilities.
- The potential affects of natural gas from shale and other sources, on the development of coal-fired generation throughout the Eastern Interconnection.

### **EISPC REVIEW**

The Subcontractor(s) shall include a review process in their responses to allow EISPC Members to review the Report(s) to ensure the greatest potential value to the EISPC processes.

### **INCORPORATION OF ENERGY ZONES WORK**

ESPIC is using the following criteria for a nominal 750 MW<sub>e</sub> advanced coal plant positioned on 300 acres of land.

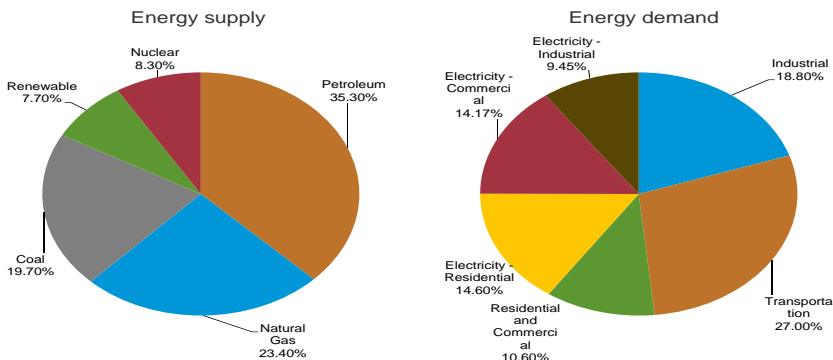


Coal Generation and Coal Gasification with CCS	
Criteria for identifying resources in Candidate Study Areas	
Parameter	Criteria
Population	Land with a population density greater than 500 people per square mile (with no) is excluded.
Earthquake	Land with safe shutdown earthquake peak ground acceleration greater than 0.3g is excluded.
Wetlands	Wetlands and open water are excluded.
Protected Areas	Protected lands (national parks, historic areas, wildlife refuges, etc.) are excluded.
Slope	Land with a slope greater than 12% (~7°) is excluded.
Landslide	Land with moderate or high landslide hazard susceptibility is excluded.
Floodplain	Land that lies within a 100-year floodplain is excluded.
Cooling Water	Land areas that are greater than 20 miles from cooling water makeup sources with at least 125,000 gpm are excluded
Infrastructure	Land that is greater than 20 miles from rail access or greater than 1 mile from barge access is avoided;
Carbon Transport and Storage	Carbon pipelines should avoid crossing fault lines, slopes greater than 12%, and crossing protected lands. Land that is greater than 150 miles from a saline aquifer geologic formation is avoided
Air Pollution Standards	Land that does not meet the EPA air pollution standards based on nonattainment data is avoided

**DEFINITION OF TERMS** graphic depictions of coal technologies and other graphics would be helpful)

Current U.S. energy supply is 83% fossil fuels;  
demand is broadly distributed among the major sectors

2009 total U.S. energy use = 94.6 quadrillion Btu



Source: EIA, Annual Energy Review 2009

## BIBLIOGRAPHY

## **EISPC CONTACT INFORMATION**

The Subcontractor(s) shall maintain contact information of state representatives that provided information to be included in the Report(s).

### **E. Initial Milestones/Deliverables (final Milestones & Deliverables to be negotiated)**

#### **Milestones:**

Coordination protocols with EISPC and the National Laboratories  
Approval of approach to the Analysis and any survey instruments (if applicable)  
Progress updates  
Initial Report  
Final Report

#### **Deliverables:**

Enhancements, if any, to the Scope of Work to be approved by EISPC  
Expected initial data sources  
Monthly Reports. Presented in written form and, at the discretion of EISPC, in person.  
Draft survey instruments, if applicable, presented to EISPC for review and comment.  
Results of survey instruments, if applicable, and recommendations for additional information.  
Draft Initial Report presented to EISPC for review and comment. Presented in written form and, at the discretion of EISPC, in person.  
Draft Final Report presented to EISPC for review and comment. Presented in written form and, at the discretion of EISPC, in person.  
Final Report. Presented in written form and, at the discretion of EISPC, in person.

### **F. Rejection of Proposals & Incurred Costs**

NARUC reserves the right to reject any or all submitted proposals not in conformance with this RFP, or for other causes. NARUC shall not be liable for any costs incurred by any Subcontractor(s) prior to the execution of a contract.

### **G. Estimated Schedule (subject to change)**

- Responses to RFP due 10/21/11
- Subcontractor(s) Selected 11/30/11
- First Conference Call 12/08/11
- Subcontractor(s) First Progress Report due 01/26/12
- Future Progress Reports due based on negotiated Milestones
- Draft Final Report Due 11/16/12
- Final Report Due 12/13/12

### **H. Questions and further information**

All questions and information requests should be addressed to Miles Keogh, NARUC's Director of Grants & Research, by email at [mkeogh@naruc.org](mailto:mkeogh@naruc.org). and Bob Pauley [bob.pauley@eispc.org](mailto:bob.pauley@eispc.org)