



**THE INGAA FOUNDATION, INC**

**Request for Proposal for a Study:  
ANALYSIS OF THE IMPACT OF  
RENEWABLE ELECTRIC  
GENERATION RESOURCES ON  
NATURAL GAS  
INFRASTRUCTURE AND  
OPERATIONS**

12/16/2009

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# 1. Request for Proposal (RFP)

## 1.1. Key Aspects of this RFP

### i) **Brief description of Project:**

The INGAA Foundation, Inc. (Foundation) is seeking a proposal from qualified consultants to assess, evaluate and quantify the likely effects on the utilization of natural gas pipeline and storage infrastructure from the dispatch of natural gas-fired generators to back up intermittent renewable generators. In particular, the project will assess the implications for natural gas pipelines and storage from the increased reliance on intermittent generators that is likely to result from the combination of state renewable portfolio standards, federal financial incentives and the possible inclusion of a federal renewable energy standard in energy and/or climate change legislation. The study will provide results at sufficient detail in order to allow an understanding of what actions, if any, need to be taken by the natural gas pipeline industry, INGAA/INGAA Foundation member companies, policymakers and regulators in response to these developments.

**ii) Who We Are:** The INGAA Foundation, Inc. was formed in 1990 by the Interstate Natural Gas Association of America (INGAA) to advance the use of natural gas for the benefit of the environment and the consuming public. The Foundation works to facilitate the efficient construction and safe, reliable operation of the North American natural gas pipeline system, and promotes natural gas infrastructure development worldwide.

**iii) Purpose of the study:** The purpose of this two-phase study is to address how the need for and operation of natural gas infrastructure will be affected if natural gas-fired generation is utilized increasingly as a backup for renewable electric generation.

This study will be a topical long range planning document to help member companies understand how an increasing role for renewable resources as part of the United States' electric power generation portfolio may affect the operation of natural gas pipeline and storage infrastructure, the services that will need to be offered by pipelines and storage operators, and the level of infrastructure needed to meet this demand while still serving the needs of other transportation and storage customers.

It is anticipated that the study will be conducted in two phases. Phase one will address the demand for natural gas and natural gas transportation and storage services attributable to intermittent renewable electric generators and phase two will address the implications of such demand, including effects on the utilization of natural gas infrastructure, the need for incremental natural gas infrastructure, the services and pricing needed to meet such demand, and the impact on other pipeline and storage customers.

**Note:** The Foundation is requesting bids for both phases of the study at this time and intends to award both phases to a single contractor (or team of contractors that has submitted a single bid). The decision to proceed with phase two will

remain contingent, however. The focus of phase two may be modified based on the results of phase one and it remains possible, although very unlikely, that after reviewing the results of phase one, the Foundation may choose not to proceed with phase two.

**iv) How?** The Contractor will perform the research, analysis, modeling or other services necessary to complete this project for a total amount specified in the contract, which will include the Contractor's fee for services and all direct costs incurred in fulfilling the obligations of the contract, including, but not limited to, travel, communications and photocopying.

**iv) When?**

Qualified contractors that wish to be considered must submit a proposal of no more than 10 pages (excluding resumes and references) by 5:00 p.m. Pacific time, January 22, 2010. One electronic and two hard copies should be sent to:

Richard R. Hoffmann  
Executive Director  
INGAA Foundation Inc.  
10 G Street N.E.; Suite 700  
Washington, DC 20002  
(202) 216-5909  
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***1.2. Contractor Qualifications***

The qualified contractor must have an experienced staff team with proven expertise in the engineering, regulatory and business structure of the electric utility, interstate natural gas pipeline and the renewable electric generation industries. The contractor must have the requisite capability to perform transient modeling of the North American electric generation market, the natural gas value chain and natural gas infrastructure as noted in the Phase one study requirements.

The contractor must have the ability to develop a project schedule, meet deadlines, and provide regular project updates. The contractor must be able to deliver well organized, professionally edited, and clearly written work products, in both draft and final form. The contractor must have proven experience making presentations.

***1.3. Background Information***

**Problem Statement:**

Thirty-two states and the District of Columbia already have adopted renewable portfolio standards (RPS) and as a result significant wind, solar, and other renewable generation technologies have been added to the electric resource mix. In addition, renewable electric power generation received an additional boost from incentives included in the February 2009 federal stimulus package, and federal renewable energy standards are part of pending federal energy and climate change legislation.

Many of these renewable electric generating resources, particularly wind and solar, operate intermittently and their availability can be difficult to forecast. The operation of wind resources varies throughout the day as wind speeds increase and decrease. Many wind resources also operate heavily at night when electricity demand is low. Solar resources operate variably depending on cloud cover and fog conditions. The variability of these resources is expected to mean that natural gas fired generation units will be needed to “back-up” renewable resources. As renewable resources operate variably throughout the day, gas-fired generation will be dispatched accordingly to meet demand.

In developing a smart energy grid that integrates an increasing level of renewable electric power generation, some are optimistic that there will be alternatives to relying upon natural gas-fired electric generators to backup intermittent renewable resources. These potential alternatives include compressed air storage, flywheels, demand side management, and plug in hybrid vehicle power cycling. Still, it is unclear at what point any of these alternatives will be available for commercial deployment and at what price they will be economically competitive.

As more renewable resources are added to the generation fleets, gas-fired generating resources likely will be operated differently than they are today. The natural gas usage during the day or from day-to-day likely will be more variable than it is today, which may create issues for natural gas pipelines, particularly those without natural gas storage or with storage located in suboptimal locations relative to this new market. Some also have suggested that an increase in reliance on renewable electric generating resources will cause a decrease in demand for electricity generated using conventional fuels and that this will negatively affect the overall demand for natural gas-fired electric generation. Increased reliance on natural gas to backup intermittent renewable generators is likely to make forecasting natural gas demand, and the resulting demand for natural gas transportation and storage services, more challenging.

The following issues need to be assessed:

1. How will an increase in reliance upon intermittent renewable electric generators affect the dispatch of natural gas-fired electric generators?
  - a. To what degree will there be less reliance upon gas-fired generators to meet base load and intermediate load requirements?
  - b. When and to what degree will there be increased reliance on gas-fired peaking generators?
  - c. Can this be met with gas-fired generators already in place or will new generators need to be constructed?
  - d. At what point will alternative technologies for providing firm back-up generation for intermittent renewable generators compete with gas-fired generators in this role?
2. How will natural gas pipeline and storage operators be affected by the need to dispatch gas-fired generators to back up intermittent renewable generators?
  - a. How will this affect the demand for natural gas pipeline and storage capacity, the services provided by pipeline and storage operators, and the need for additional natural gas infrastructure?
  - b. Will dispatching gas-fired generators to back up intermittent renewable generators create operational problems for interstate pipelines and storage operators?
  - c. What issues may be created by the fact that, while such gas-fired generators and supporting services will be called upon intermittently, such services must be

available on short, if not instantaneous, notice in order to ensure the reliability of electric power.

- d. How will such intermittent natural gas services be priced and who will bear responsibility for the cost of such services?
- e. How will other natural gas transportation and storage customers be affected by such services?
- f. Will pipeline tariffs need to be modified?
- g. Will a new level of coordination be needed between pipeline and storage operators and RTOs, ISOs and NERC or other reliability organizations?

#### ***1.4. Scope of Work***

The purpose of this project is to analyze the interaction between renewable electric generation and natural gas-fired electric generation and the implications of this interaction for natural gas infrastructure. The contractor must explain its approach and methodology for determining the most likely supply/demand and infrastructure scenarios and for bracketing such scenarios. This must be presented to the Foundation and its steering committee before any model runs.

In developing its proposed methodology, the contractor will discuss the issues with EEI, EPRI, and NERC to determine if they have similar work underway and to get their perspective in this analysis.

In addition this study should include:

Phase one:

- Regional projections of the amount, timing, and type of renewable resources that are expected will be developed across the U.S. through 2025
- Regional profiles of typical daily operations of renewable and gas-fired electric generation resources [by type and location]
- Analysis of technologies that would be alternatives to gas-fired generation as a backup for intermittent renewable generators, including technical feasibility, economic viability
- The impacts of the intermittency of renewable resources on the generation of electricity using natural gas and other fuels, as well as the impacts on energy storage options, and the subsequent transient impact on electric generation peaking plant operations.
- Transient modeling of expected renewable electric generation and backup power from natural gas and other fuels to demonstrate the impact on electric generation plants and energy storage infrastructure; this should include modeling operational needs within a day on several representative sample systems.
- Analysis of the most efficient and economical way(s) to balance the electric generation load requirements on a full fuel cycle basis. (i.e. source energy, wells to wheel).

The draft report shall answer the appropriate questions posed in the problem statement in this RFP.

Phase two:

- Regional natural gas demand projections to 2025 including identification of the incremental effects on natural gas demand attributable to renewable electric generation resources.

- Transient pipeline flow modeling to demonstrate how the operation of gas-fired generators forecasted in phase one may affect the operation of natural gas pipeline and storage infrastructure. This should include several scenarios to illustrate how demand may vary within a day and from day-to-day, such as “high and low wind” and “high and low solar”, and to illustrate how the impacts may vary due to the configuration of a pipeline and its customer base
- The effect of gas-fired power plant operation forecasted in phase one on the need for new or reconfigured pipeline and storage infrastructure

The draft report shall answer the appropriate questions posed in the problem statement in this RFP.

### ***1.5. Deliverables***

The primary deliverable will be a written report and outreach/communication materials. The written report must include an executive summary and must be conveyed to the project contact in the form of a clean, reproducible paper original, a Microsoft Office format version and a PDF version, unless specified differently in the final contract agreement. In addition, the modeling results must be provided in an Excel or similar format.

Other deliverables include:

- Project schedule
- Report outline
- Draft report
- Final report
- PowerPoint and oral presentation to INGAA Foundation membership summarizing the conclusions of the study.
- A briefing for members of the trade press and other media and regulatory agencies that focus on energy issues.
- Talking points for discussing the report results
- Communications Plan: Cost estimate for an additional presentation(s) at locations around the country to present results of this report-- on an as needed/actual basis.

### ***1.6. Term of Contract***

The anticipated contract start date will be 02/08/2009. Revisions in project scope, definition, cost, or schedule shall be made only by written mutual agreement by the authorized representatives of the parties whose signatures appear on the final contract agreement.

### ***1.7. Payments, Incentives, and Penalties***

The Contractor will perform the research, analysis, consulting, modeling or other services necessary to complete this project for a total amount not to exceed the bid amount which includes the Contractor's fee for services and all direct costs incurred in fulfillment of the contract, including, but not limited to, travel, communications and photocopying. Other terms will be detailed in the final contract agreement.

### ***1.8. Contractual Terms and Conditions***

Contract terms and conditions will be detailed in the final contract agreement.

### ***1.9. Requirements for Proposal Preparation***

The proposal, at a minimum, should include: a detailed statement of how the contractor proposes to meet the study objectives including the methodology, a budget that includes a breakdown of tasks and deliverables, a description of the firm's expertise in the subject matter, and the background of the team that will work on the project.

### ***1.10. Evaluation and Award Process***

Proposals will be evaluated, at a minimum, on the following criteria:

- Extent and quality of the project description and overall approach, including the staff expertise/qualifications, staff knowledge, and resources or the ability to obtain them, to successfully achieve the goals of the proposed project.
- Extent and quality to which the proposal demonstrates knowledge regarding the renewable and natural gas industries and modeling capability
- Applicant's ability to successfully complete and manage the proposed project.
- A review of the budget narratives to determine if costs are reasonable and commensurate with activities proposed.

### ***1.11. Process Schedule***

12/16/2009 - RFP distributed to potential contractors

01/22/2010 - Proposals due to study contact

02/01/2010 - Contract award decision

02/08/2010 - Contract start date

07/31/2010 - Desired date of completion

### ***1.12. Points of Contact for Correspondence***

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