



**GDS ASSOCIATES, INC.**

engineers and consultants

# Examination of Long-term Natural Gas Hedging Proposals

RFP 15-10 Docket No R-32975

Request for Proposal Prepared for:  
**Louisiana Public Service Commission**

Prepared by:

**GDS Associates, Inc.**

1850 Parkway Place, Suite 800

Marietta, GA 30067

770.425.8100 | 770.426.0303 fax

[www.gdsassociates.com](http://www.gdsassociates.com)

September 21, 2015





**GDS ASSOCIATES, INC.**  
Engineers and Consultants

Ph: 770.425.8100  
Paul Wielgus  
Managing Director

Fax: 770.426.0303  
paul.wielgus@gdsassociates.com

September 21, 2015

Mr. Brandon M. Frey  
Louisiana Public Service Commission  
Office of the General Counsel  
602 North Fifth Street (Galvez Building) (70802)  
Baton Rouge, Louisiana 70821-9154

RE: Energy Program – Consulting Services

Dear Mr. Frey:

Attached is GDS Associates' (GDS) proposal in response to RFP 15-10 Docket No. R-32975 regarding examination of long-term natural gas hedging proposals. GDS has a wide range of experience and expertise in this area including experience in various jurisdictions. GDS is well positioned to fully meet the needs of the Louisiana Public Service Commission as defined in the RFP. In summary, GDS has:

- Hands on commercial experience and expertise with long term natural gas hedging
- Wide range of regulatory and jurisdictional expertise in natural gas hedging
- Extensive and comprehensive natural gas risk management experience
- Best practices counterparty and credit analysis expertise
- Gulf Coast, including Louisiana, natural gas supply and pricing experience

GDS appreciates the opportunity to bid on this project and please call me if you have any questions regarding our proposal. Thanks for your consideration.

Sincerely,

Paul Wielgus  
Managing Director

## TABLE OF CONTENTS

<b>1 GDS' UNDERSTANDING OF THE SCOPE OF REPRESENTATION</b> .....	<b>1</b>
<b>2 OVERVIEW OF GDS ASSOCIATES</b> .....	<b>3</b>
2.1 Introduction and Background of GDS Associates, Inc.....	3
<b>3 PERSONNEL QUALIFICATIONS AND ROLES</b> .....	<b>5</b>
3.1 GDS Team: Key Personnel.....	5
3.1 Individual Personnel Qualifications and Roles .....	5
Paul Wielgus, BS, MS, MBA, JD .....	5
Lori Schell, Ph.D., ERP.....	6
Liz Grossman, BS, MBA.....	6
<b>4 PROJECT APPROACH AND RELEVANT EXPERIENCE</b> .....	<b>7</b>
4.1 Project Approach .....	7
4.2 Relevant Experience .....	11
<b>5 ESTIMATE OF COSTS</b> .....	<b>16</b>
<b>6 CONFLICT OF INTEREST</b> .....	<b>17</b>
<b>7 WHY GDS?</b> .....	<b>18</b>
7.1 Minimum Requirements .....	19
7.2 GDS PROJECT MANAGEMENT PRACTICES .....	19
7.3 Organization Chart .....	20

### APPENDIX A | RESUMES OF KEY PERSONNEL

### APPENDIX B | GDS RELEVANT SERVICES

Overall Services

Natural Gas Services

Risk Management Services

Decision Advisory Services

### APPENDIX C | NATURAL GAS DILEMMA AND RTOs ARTICLE

# 1 GDS' UNDERSTANDING OF THE SCOPE OF REPRESENTATION

The Staff of the Louisiana Public Service Commission (“Commission” or “LPSC”) determined that no Commission-jurisdictional Electric Investor-Owned Utilities (“IOUs”) currently have long-term, fixed-price natural gas procurement programs. Therefore, to foster natural gas price stability, the LPSC on June 24, 2015 issued GENERAL ORDER R-32975: LONG-TERM NATURAL GAS HEDGING PILOT PROGRAM (“Hedging General Order”). Under the Hedging General Order, Louisiana Electric IOUs must establish a Long-Term Procurement Pilot Program for up to a three-year period. The purpose of the Long-Term Procurement Pilot Program is to provide natural gas price stability on a portion of the Electric IOU’s fuel portfolio for a minimum of five (5) years.

The LPSC is seeking the services of an outside contract regulatory consultant to assist it in reviewing the long-term natural gas procurement plans submitted by the Electric IOUs. Under the Pilot Program, each Electric IOU must submit three separate long-term natural gas procurement plans, each of which will require a separate review. However, since the proposed procedures include both an application process and a certification process (or notification of inability to procure), there is significant uncertainty in the amount of effort required by the outside consultant over the three-year term of the Pilot Program. The LPSC has consequently requested only an hourly rate quote rather than an estimated total budget.

The Hedging General Order allows a long-term natural gas procurement plan submitted by an Electric IOU to utilize one or more of five cost stabilization instruments, including:

1. Long-term, fixed-price contracts with physical natural gas delivery
2. Indexed physical delivery contracts with financial price hedging
3. Futures contracts
4. Natural gas supply acquisition through a direct interest or joint venture
5. Another type of instrument that provides long-term natural gas cost stability.

It is important to note that the three-year Pilot Program is occurring during what is expected by most to be an extended period of low natural gas prices. Low natural gas prices coupled with (i) increasing use of natural gas for power generation (often replacing existing coal-fired power generation), (ii) declining demand for energy from Electric IOUs due to energy efficiency and increased on-site generation, (iii) increased environmental regulations, and (iv) ongoing incentives for renewable generation make it critical that these market and regulatory factors be considered during any review of the proposed long-term natural gas procurement plans.

As the Commission recognizes, there are risks associated with fixing long-term natural gas prices and volumes in the face of future market and regulatory uncertainties. This is one reason that the Pilot Program has a limited, three-year duration. Another reason is that the trade-offs between the Pilot Program’s stated cost stabilization goal and the anticipated premiums required to lock in long-term prices are uncertain. There is no objective measure of ratepayer willingness-to-pay for cost stabilization. To minimize the actual cost paid for cost stabilization, the Commission must instill as much competition into the process as possible by ensuring that long-term natural gas procurement is done at arm’s length and in as efficient a manner as possible. Procurement that meets both of these criteria can more readily be considered an acceptable process by which to meet the Electric IOU’s obligation to provide safe and reliable service at the lowest reasonable rates, though there is clearly some point at which cost stabilization and avoidance of potential losses come at a cost too high for ratepayer acceptability.

The Hedging General Order provides guidelines on the procedures that an Electric IOU should go through for each of three approaches to its long-term natural gas procurement. Guidelines are included for the following three procurement approaches:

1. Procurement through Request for Proposal
2. Procurement through bilateral negotiation
3. Procurement through long-term hedges or exchange-traded futures contract purchases

There are differences in the procedural schedule, the application process for procedural approval, and the certification process for ultimate Commission approval for each of the three approaches to long-term natural gas procurement. Each Electric IOU must file an application for each of the three approaches, though the Electric IOU may choose not to pursue any given approach if sufficient rationale for not doing so is provided. The use of hedges or futures contract includes significantly greater assessment of credit risk and the added requirement of providing a risk management policy for hedged physical delivery and management of financial futures and basis contracts.

GDS proposes to assist in-house Staff counsel and outside counsel (if applicable) in the following tasks:

1. Reviewing the long-term natural gas procurement plans submitted
2. Preparing data requests and providing data responses as part of the discovery process
3. Drafting a report based on plan review and data responses from all parties
4. Participating in status conferences as required
5. Participating in hearings as required
6. Filing testimony as required
7. Assisting Staff in its ultimate recommendations and certification

Greater detail as to GDS' approach to the review and analysis of the long-term natural gas procurement plans is provided in Section 4 of this proposal.

GDS will work closely with the LPSC and its Staff and counsel to identify how the above list of tasks is most effectively carried out. GDS will also contribute its insights based on its previous work in similar state regulatory proceedings in Utah, Texas, Georgia, and Nevada.

## 2 OVERVIEW OF GDS ASSOCIATES

### 2.1 INTRODUCTION AND BACKGROUND OF GDS ASSOCIATES, INC.

**G**DS Associates, Inc. (GDS) is a multi-service consulting and engineering firm formed in 1986 that now employs a staff of more than 175 in seven locations across the U.S. Our consultants are recognized leaders in their respective fields, dedicated to their clients, innovative in their approach to meeting unique challenges, and known for consistently being available when needed. Our broad range of expertise focuses on clients associated with, or affected by, electric, gas, water and wastewater utilities. In addition, we offer information technology, market research, and statistical services to a diverse client base.

The following are brief descriptions of the services that GDS provides relevant to the scope of services to be provided by GDS as the regulatory consultant assisting the Commission in reviewing the long-term natural gas procurement plans submitted by the Electric IOUs. Given the range of issues that might arise as part of the review process, it is clear that any number of these services may become relevant to the analysis. The full range of GDS' services is listed in Appendix B.

#### Natural Gas Consulting Services

GDS provides creative solutions to help our clients meet challenges arising in both regulated and competitive environments within the evolving natural gas industry. Our team of highly qualified professionals works to address complex economic, price, risk management, engineering, policy, and regulatory, including expert testimony, issues with clients including consumer groups, publicly owned utilities, and regulatory authorities.

#### Enterprise Risk Management Services

Organizations can help achieve their goals in this volatile and uncertain business environment by implementing an effective enterprise risk management program. This program involves identifying, evaluating, and mitigating the risks that threaten business goals. GDS can design a risk management program that will assist leadership teams with this challenge. GDS understands that risk management includes energy price management and regulatory compliance, and that each client faces a unique set of risks and challenges. To fully understand and mitigate these risks and others, and their impact on cost structures, leadership teams should have a complete view of these exposures. GDS' approach incorporates quantitative and qualitative techniques to capture, assess measure, evaluate, and mitigate the risks that can impact objectives.

#### Decision Advisory Services

GDS understands that organizations sometimes need only specific experienced input, a quick critique of the process, or just a sounding board. GDS can provide the specific decision making help the Commission needs. We can customize the best fit to enable the LPSC or its Staff to make the best decision. Whether it's assisting with the decision analysis, working with Staff conducting the analysis, collaborating with counsel, or advising the Commission itself, GDS can help. Our expertise includes project analysis, valuation, life cycle costs, modeling, risk analysis, negotiations, and contracting. Our offering include experienced input, supplemental service, analysis team support, collaboration, advisory, process audit, and expert testimony.

#### Power Generation Services

Greater competition has made effective management of power generation costs and performance increasingly important. Over a span of many years, GDS has helped numerous power plant owners, co-owners and non-utility generators reduce costs and achieve improved performance by identifying inefficiencies in power plant construction, operation and maintenance practices, and providing practical solutions. These solutions include fuel contracting, pricing, and reliability.

## Regulatory and Restructuring Services

GDS provides comprehensive regulatory and restructuring services to generators, transmitters, distributors, and large users of energy. Numerous state and federal restructuring initiatives have made regulatory planning and strategy development essential. To assist our clients with this task, GDS brings decades of expert regulatory experience in key areas such as rate design and litigation, contract negotiation, fuel related expert testimony, and transmission access.

## Transmission Services

GDS Transmission Services assist load-serving entities, transmission providers, independent generating companies, and state regulatory agencies with their transmission issues and has the planning, operations, regulatory, and engineering experience necessary to assist its clients in navigating through these challenging times. In addition to today's competitive and RTO issues, GDS also offers expertise in the areas of transmission maintenance, equipment procurement, and cost-of-service issues including a power generator's fuel and pricing RTO risk management requirements and the implications of nonperformance in these areas on the generator's costs and RTO consequences.

## Integrated Resource Planning, Energy Assurance Planning Services

Securing adequate and reliable energy resources is crucial to thriving in a more competitive electrical market. GDS has helped guide its clients through uncharted territory by providing power supply portfolio, integrated resource planning, transmission planning and reliability assessments, load forecasting, fuel planning and contracting, risk management, financial, wholesale and retail rate-making and competitive analysis services.

## Load Forecasting Services

The load forecast is a key input for system and financial planning; as a result, the forecast must provide timely and reliable projections. GDS has provided load forecasting services since our inception in 1986. From day-ahead hourly forecasts to intermediate and long term forecasts, GDS has maintained the appropriate level of staff, expertise and technological resources to meet our clients' forecasting needs. Proper load forecasting is required to help address the operational/volume risks associated with price hedging.

## Financial Analysis and Rate Services

The recent pace of regulatory change and uncertainty is unrivaled in the utility industry and requires equally unparalleled flexibility in ratemaking and regulatory strategies. GDS has been at the forefront of industry restructuring policy, offering broad expertise in regulatory accounting, economics, finance, and ratemaking, including accounting for energy price hedges.

## 3 PERSONNEL QUALIFICATIONS AND ROLES

### 3.1 GDS TEAM: KEY PERSONNEL

This section of our proposal identifies the key personnel making up the GDS Team. The GDS Team brings together seasoned energy professionals, each of whom brings a particular expertise that serves to strengthen the many competencies that will be required to address the many issues that will arise as part of the Commission’s long-term natural gas procurement Pilot Program. We also identify the Principal Contact for the Commission and its Staff, who will be responsible for ensuring that the project is timely, responsive, and of superior quality.

The GDS consultants assigned to this project are listed below and short bios for each consultant are also provided. Full resumes of the GDS consultants assigned to this project are provided in Appendix A. Resumes describe relevant responsibilities from other projects that will help the bid evaluation team evaluate our qualifications and experience.

Name	Title	Years of Energy-Related Experience	Education	Professional Certifications	Related Experience
<b>Paul Wielgus</b>	Managing Director, GDS	30	B.S., Economics; M.S., Mineral Economics; M.B.A.; J.D.	Member of State Bar of Texas	Hedging Transactions, Risk Management Programs
<b>Lori Schell</b>	President, Empowered Energy	30	B.A. (Honors), Economics; Ph.D., Mineral Economics & Operations Research	Certified Energy Risk Professional	Risk Management, Regulatory/Policy Analysis, Hedging Book Analysis, Forward Curves
<b>Liz Grossman</b>	Principal, Liz Grossman Consulting	32	B.A., Management with minor in Economics; M.B.A., Finance	Fitch Learning Credit Instructor	Counterparty Credit

### 3.1 INDIVIDUAL PERSONNEL QUALIFICATIONS AND ROLES

This section provides a clear description of the roles and responsibilities of each of the key personnel that make up the GDS Team for this project.

#### Paul Wielgus, BS, MS, MBA, JD

Mr. Paul Wielgus will be the Project Manager and Principal Contact for the Commission and its Staff. Mr. Wielgus’ role is to provide overall project management and to guide the policy analysis required by the long-term natural gas procurement applications filed by the Electric IOUs. Mr. Wielgus specializes in industry best practices and has more than 30 years of commercial experience in energy markets, with emphasis on fuels and fuels transportation markets and contracting, energy transaction contracting, energy risk management, power project development, power asset management, regulatory due diligence, and expert witness testimony.

Mr. Wielgus’ experience includes working in the industrial end use, in power generation (with both regulated utilities and independent power producers), and in the LDC supply sectors, along with energy consulting for power entities on fuels, energy projects, and energy hedging and risk management transactions. Mr. Wielgus provided expert witness testimony in the areas of fuels, power assets, risk

management and hedging, pricing, and IRP and related matters. Mr. Wielgus has experience working directly with corporate boards of directors and public utility boards, public utility commissions, and public agencies.

Mr. Wielgus has specific commercial, electric and gas utility, and regulatory experience in Louisiana. Before joining GDS, Mr. Wielgus held senior commercial management positions with the electric utility affiliates of AEP and Entergy, and with NRG. Mr. Wielgus began his career in the fuels department of Gulf States Utilities and has commercial experience in the fuels area as a seller, buyer, advisor, and expert witness. He has experience in energy risk management including contracting, financials, swaps, pre-pays, and policies and procedures. Mr. Wielgus holds a B.S. degree in Economics, an M.S. degree in Mineral Economics, an MBA, and a JD. He is a licensed attorney in Texas.

### Lori Schell, Ph.D., ERP

Dr. Lori Schell will provide the natural gas and power market analyses required to assess the long-term natural gas procurement applications filed by the Electric IOUs. Dr. Schell will provide all but the credit-related spreadsheet and database analyses required as part of the application review and certification processes. These analyses will be particularly important for any financial hedging proposed in the Electric IOUs' long-term natural gas procurement plans and may involve forward curve development and market-to-market and value-at-risk analysis. Dr. Schell will also provide expert witness testimony related to her findings as requested by the Commission and its Staff.

Dr. Schell is highly numerate and specializes in both the detailed analysis of corporate and utility databases of all levels of complexity and in explaining the findings of her analyses in language that is understandable to regulators and policy makers and appropriate for regulatory proceedings. Dr. Schell has provided expert witness testimony related to public utilities at the Federal Energy Regulatory Commission, in several states, and in the province of Alberta.

Dr. Schell has 30 years of experience in energy-related economic, regulatory, risk management, and policy analysis, including work at the U.S. Department of Energy, Los Alamos National Laboratory, Air Products, Trigen Energy, and several consulting firms. Consulting clients have included natural gas producers, state regulatory agencies, emerging technology manufacturers, independent power producers, and university campuses. Dr. Schell holds a B.A. (Honors) in Economics and a Ph.D. in Mineral Economics and Operations Research. She is certified as an Energy Risk Professional ("ERP") by the Global Association of Risk Professionals ("GARP") and was featured in GARP's Membership Spotlight in September 2014. She is the current Vice President-Communications for the International Association for Energy Economics and a Senior Fellow and Past President of the U.S. Association for Energy Economics.

### Liz Grossman, BS, MBA

Ms. Liz Grossman will provide all of the credit-related analysis to evaluate proposed counterparties, specifically analyzing the financial strength of the proposed counterparties to enter into any long-term natural gas procurement agreements proposed under the Commission's Pilot Program. Additionally, Ms. Grossman will assist with the determination of appropriate credit terms in counterparty documentation to mitigate (to the extent possible) counterparty credit exposure(s). Ms. Grossman has 32 years of experience in Credit Risk Management, and served as a Senior Credit Officer and Director at a various major international financial institutions including Deutsche Bank and BP Paribas. Currently, Ms. Grossman provides consulting services for best practice credit risk management for various clients, including Con Edison of New York. Ms. Grossman also instructs courses on counterparty credit, financial analysis, and risk management for Fitch Learning.

Ms. Grossman holds a B.S. degree in Management from the State University of New York at Binghamton and an MBA in Finance from the Lubin School of Business at Pace University. She is the co-author of *Bank and Sovereign Risk Analysis* (Euromoney Books, December 2013).

## 4 PROJECT APPROACH AND RELEVANT EXPERIENCE

### 4.1 PROJECT APPROACH

#### GDS' APPROACH TO REVIEW OF LONG-TERM NATURAL GAS PROCUREMENT PLANS

GDS takes a very methodical approach to its review of long-term natural gas procurement and hedging plans. This type of methodical approach is a subset of GDS' enterprise risk management ("ERM") services. This ensures that issues do not fall through the cracks during the review process.

The bullet points in each section below describe GDS' proven and proposed approach to each of the three types of long-term natural gas procurement identified in the Hedging General Order and (ii) identify the major steps required for each type of review.

#### A. Review of Procurement through Request for Proposal

GDS has significant experience from beginning to end in the Request for Proposal ("RFP") process and has accomplished long-term procurement using the RFP process for many natural gas and electric clients. GDS is knowledgeable in the design and issuance of natural gas supply proposals, and in the detailed review and assessment of the proposals received in response to its RFPs.

GDS' approach to the RFP process includes the following major step reviews:

- Objectives of the RFP process
- Parameters of the RFP process
- Review of the RFP documents
- Adequacy of information provided
- Skills of Company's RFP team
- Company's approach to the RFP
- Exiting and forward looking price portfolio
- Confirmation of forward looking operational needs
- Going forward volumetric risk review
- Format and structure of the RFP document(s)
- Advertisement of RFP and follow-up noticing
- Company compliance to RFP rules
- Clarity of requested price hedging products
- Bidder registration and qualification process
- Adequacy of counterparty contract term requirements
- Sufficient explanation of counterparty credit requirement
- Sufficiency of fuel plan for hedging period
- Credit compliance and monitoring
- Consistency and fairness of bidder follow-up
- Adequate scheduling of bidding steps
- Proper noticing to all registered bidders
- Bidder Q&A process
- Firmness of hedging prices bid
- Bidder risk analysis
- Liquidity and basis risk analysis
- Comparison of bids to exchange prices
- Evaluation of price versus non-price (e.g., scheduling flexibility) factors
- Variability of bids for same or similar hedging products
- Review and analysis of bids

- Transparency of bid prices and structures
- Bidder contacts and correspondence
- Disqualifications, short list, and final winner(s) process

## **B. Review of Procurement through Bilateral Negotiations**

GDS has actively negotiated for long-term natural gas supplies on behalf of numerous clients in different regions of the country but with emphasis on the Gulf Coast region. Based on this experience, GDS has found that many attributes of RFP best practices also apply to bilateral negotiations. In addition to the bullets provided above with respect to RFP best practices, the following complementary key procedures work best in reviewing contracts developed through bilateral negotiations:

- Confirmation of ability to provide hedges bundled with physical supply
- Potential confirmation of proven past performance
- Adequate access to Company's counterparty correspondence
- Requiring a proper audit trail of negotiations
- Confirming fairness of dealings
- Consistency of winning counterparty terms and conditions
- Confirming selected negotiated transactions align with hedging plan objectives

## **C. Review of Procurement through Long-Term Hedges or Exchange-Traded Futures Contract Purchases**

Use of financial hedging for long-term natural gas procurement introduces a whole new overlay of complexity by requiring an appropriate risk management policy and the supporting personal structure to support all of the facets of the Electric IOUs natural gas hedging activities. GDS has strong experience in this area and will provide assistance and a full regulatory review of the following items:

- The Electric IOU's natural gas price risk management policies and procedures.
  - Ensure that the Electric IOU's risk management policies and procedures have sufficient internal checks and balances to avoid over-concentration of decision making in any single person or department.
  - Ensure that the Electric IOU's risk management policies and procedures provide clear statements of risk management goals and strategies.
  - Ensure that the Electric IOU's risk management policies and procedures include sufficient provisions for educating upper management on the basic truism of hedges and swaps as it relates to strike prices for hedges and swaps: Fixed is fixed is fixed.
- The proposed levels of physical gas hedges and financial gas swaps.
  - Ensure that that the proposed volumes of hedging (physical and financial) is appropriate for the projected volumes of natural gas requirements over the term of the hedging; ensure that the Electric IOU is never in a speculative position of having more hedged volume than natural gas requirements.
  - Ensure that an acceptable range of "hedge-able" prices is established during the application process so that hedge execution can proceed within that range as the procurement process proceeds.
  - After certification occurs, GDS will periodically prepare a detailed matrix that identifies the timing, volume, and pricing of all natural gas-related hedges and swaps.
- Post-certification timing of actual physical gas hedges and financial gas swaps.
  - Provide a comparison of the pricing of all natural gas-related hedges and swaps with concurrent natural gas market conditions to ensure that those hedges and swaps properly reflected those market conditions.

- Ascertain to the greatest extent possible if there were corporate goals unrelated to ratepayer interests that may have driven the timing of natural gas related hedges and swaps.
- Compare and contrast the Electric IOU's overall gas hedging strategy with utility industry best practices.
  - Assess whether the Electric IOU's overall gas hedging strategy has clearly defined goals, strategies to meet those goals, and mark-to-market mechanisms to reflect the changing value of hedges and swaps.
- Cost and risk to customers of Electric IOU's hedging strategy.
  - Confirm (or refute) that the Electric IOU's hedges and swaps were consistent with its stated risk management goals and strategies.
- Value to ratepayers vs. shareholders of the Electric IOU's hedging strategy.
  - Examine whether the Electric IOU's accounting for its hedges and swaps was consistent with its stated risk management goals and strategies.
- Identify how hedging gains or losses were divided between ratepayers and shareholders.
- Determine the appropriateness of the Electric IOU's proposed hedging strategy.
  - Compare the Electric IOU's stated risk management goals and strategies with any guidelines provided by the LPSC.
  - Recommend appropriate modifications, if any, to the Electric IOU's natural gas price risk management policies and procedures.
- Provide recommendations based on results of all of the above steps.

#### **D. Logistics of the Long-Term Procurement Plan Review Process**

GDS sees the work of reviewing any given Electric IOU's proposed long-term natural gas procurement plan as proceeding in two potentially overlapping phases.

- Phase 1 will generally consist of reviewing the Electric IOU's proposed long-term natural gas procurement plan and any associated risk management policies and procedures (if applicable). The specific items to be covered in the review of each proposed plan will generally follow the steps outlined in the preceding section.
- Phase 2 will consist of preparing, reviewing, and defending testimony related to GDS' review of each procurement plan in Phase 1.

The general activities associated with Phase 1 and Phase 2 will be repeated for each Electric IOU's three proposed procurement plans, with the specific activities to be determined by the details of each individual procurement plan. Although each individual procurement plan will differ in its details, the applicable risk management policies and procedures for each Electric IOU should be the same regardless of the plan specifics, so the effort required for each subsequent review should be reduced. It is anticipated that there will be significant overlap between the activities outlined in Phase 1 and Phase 2.

#### **Phase 1: Review Electric IOU's Proposed Long-term Natural Gas Procurement Plan**

- In concert with LPSC, Staff, and attorney(s) assigned to this case, begin analysis of the natural gas procurement plan and any applicable risk management policies and procedures; identify specific issues that need to be addressed.
- Review key issues with the LPSC, Staff, and attorney(s), as appropriate.
- Identify additional significant issues based on initial review and analysis of Electric IOU company materials.
- Develop and response to discovery questions.
- Attend technical conferences or meetings as requested by the LPSC or its Staff.
- Provide progress updates to the LPSC or its Staff on a regular basis.

- Prepare a brief report, as requested, setting forth analysis, conclusions and recommendations in each of the identified issue area.

**Phase 2: Regulatory Proceedings Tasks**

- Prepare and submit to the LPSC written direct testimony, in final draft form, for review and approval at least seven working days prior to the filing deadline, as requested.
- Respond to discovery requests in a timely and professional manner.
- Prepare and submit to the LPSC written rebuttal/surrebuttal testimony in final draft form for review and approval at least three working days prior to the filing deadline.
- Participate in settlement negotiations, as directed by the LPSC.
- Testify and submit to cross-examination at hearings before the LPSC.
- Assist LPSC counsel with cross-examination of opposing witnesses at hearing.
- Assist LPSC counsel, as requested, in the preparation of any case briefs.
- Review the Commission’s final order and participate in any requested review and discussions regarding possible appeal of the Commission’s order.
- Prepare a written exit review of each long-term natural gas procurement plan reviewed (as requested).

As Part of the Phase 2 process, GDS will explore more fully the interaction of the proposed long-term natural gas procurement applications with energy cost adjustment mechanisms such as the Purchase Gas Adjustment and the Fuel Adjustment Clause. GDS’ initial thoughts on the subject are as follows, though a more-detailed analysis as part of the regulatory review process may lead to a different conclusion.

- Since the General Hedging Order applies only to Commission-jurisdictional Electric IOUs and the Commission’s Purchase Gas Adjustment (“PGA”) applies to Commission-jurisdictional natural gas companies, the Commission’s PGA Order of 3/24/1999 does not appear to directly apply.
- Conversely, the Commission’s Fuel Adjustment Clause (“FAC”) Order of 10/1/97 does appear to apply directly to Commission-jurisdictional Electric IOUs, making it necessary to consider how the directives of the FAC Order may impact each of the long-term natural gas procurement plans filed as part of the Pilot Program.
  - The FAC Order explicitly states that “All electricity consumers are ensured that they will only pay the actual cost of fuel utilized to produce electricity, no more and no less.”
  - To the extent that the above phrase could be construed to discourage hedging, the LPSC issued a waiver “to the extent necessary.”
  - It is GDS’ opinion that all hedging costs incurred are part of “the actual cost of fuel utilized to produce electricity” and that such a waiver, though reassuring, is likely unnecessary.
  - That being said, the explicit provision of the waiver should dispel any doubts that any natural gas procured by Electric IOUs under a certified long-term procurement plan will not be found imprudent based solely on disparities between contract pricing and market prices at the time of settlement. This unwillingness to “second guess” hedging decisions that reflected market conditions at the time the hedges were entered into wisely continues the decision made by the Commission in the Gas Procurement Plan General Order in Docket No, U-25729 (7/20/2001).
  - It is clear that the Commission fully understands that the prices of natural gas futures contracts at any point in time are not a forecast of what natural gas spot prices will be when the future delivery month actually arrives. Natural gas futures contracts are simply “transactable” contracts that allow buyers and sellers to financially lock in prices for future delivery months.
  - GDS finds it appropriate that the LPSC has allowed for prudence review of long-term procurement based on mismanagement.

- GDS will investigate the natural gas price stability intent of the Pilot Program with LPSC policy makers to avoid any potential inconsistency between that intent and the operations of the FAC mechanism.

#### **E. Credit Review and Analysis Process**

Counterparty credit review and analysis processes will play a key role in the successful implementation of the Commission’s program. A credit process that directs a disciplined and well defined set of protocols and criteria will include the following steps:

- Criteria
- Review
- Analysis
- Monitor
- Measurement
- Administration

The Electric IOU’s management of the hedging counterparties’ credit risks within the risk tolerance of the credit process will be a major part of measuring the effectiveness, cost, and overall success of the Electric IOU’s hedging program. The list of bullets below sets out the high points of credit risk management objectives and related considerations involved in the review of an Electric IOU’s credit risk management process. Lastly, clearly established credit policies and procedures going into the hedging program will establish a responsibility for measuring and mitigating counterparty risk.

- Approved credit program and process
- Credit controls
- Forms of credit risk
- Counterparty analysis
- Credit ratings
- Internal counterparty credit ratings
- Credit approvals
- Credit enhancements
- Amount of open line of credit
- Counterparty credit exposure
- Limits of defined groups of counterparties
- Approval requirements and conditions
- Required contract terms and conditions for credit
- Approval authority
- Credit risk mitigation
- Collateral management
- Noncompliance reporting and actions

## **4.2 RELEVANT EXPERIENCE**

### **ON-POINT EXAMPLES OF SOME OF THE GDS TEAM EXPERIENCE WITH LONG-TERM NATURAL GAS PROCUREMENT AND HEDGING COMMERCIAL AND REGULATORY ACTIVITIES**

#### **A. Utah Office of Consumer Services, Natural Gas Hedging and Procurement Review Proceedings**

GDS, represented by Mr. Wielgus and Dr. Schell, has worked closely with the Utah Office of Consumer Services (“OCS”) since August 2009 on a variety of proceedings related to natural gas procurement and hedging. GDS’ contract with the OCS has been extended for another year and all of its services have been provided on schedule and under budget. As part of its work with OCS, GDS played a lead role in an all-party, multi-year collaborative effort to modify PacifiCorp Energy’s Risk Management Policy (“RMP”)

guidelines with regard to long-term natural gas procurement. PacifiCorp Energy is a multi-state electric utility that has an active natural gas (and power) risk management program with highly structured processes, dedicated management resources, and state-of-the-art risk management tools. As result of the collaborative effort GDS helped spearhead, PacifiCorp Energy made several important modifications to its hedging program, including a mandate to enter into two extended, long-term natural gas supply contracts covering a material percentage of PacifiCorp Energy's projected natural gas requirements.

GDS' involvement with OCS with respect to PacifiCorp Energy's natural gas procurement efforts includes:

- Comparing PacifiCorp Energy's risk management practices to other jurisdictions
- Comparing PacifiCorp Energy's risk management practices to industry best practices
- Undertaking extensive discovery through detailed data requests and data responses
- Providing written testimony at all stages (initial, rebuttal, surrebuttal)
- Defending written testimony at oral hearing
- Analyzing the impact of price hedges on ratepayers
- Assessing the regulatory compliance of PacifiCorp Energy's RMP
- Spearheading collaborative on-site meeting with all interested stakeholders
- Reviewing PacifiCorp Energy's RMP and related procedures
- Checking for risk management noncompliance
- Reviewing risk management models at a highly detailed level
- Reviewing the trading and hedging books
- Reviewing front and back office procedures and interactions
- Reviewing on-site trading floor practices
- Reviewing forward price curves at various points in time
- Assessing price volatility calculations
- Pre-reviewing and commenting on certain PacifiCorp Energy hedging decisions
- Meeting one-on-one with PacifiCorp Energy's risk management senior representatives
- Reviewing PacifiCorp Energy's semi-annual hedging reports
- Performing a risk management audit review and providing a written report on findings
- Providing OCS timely written and conference call reports

The respect that GDS has earned throughout its years of working on behalf of OCS is reflected in the fact that PacifiCorp Energy has in the past approached OCS with proposed changes to its RMP to ensure that GDS finds the potential changes acceptable and will not challenge them once filed.

#### **B. City of Alexandria Louisiana, Natural Gas Contracting and Hedging**

GDS worked closely with the City of Alexandria ("City") to transform the City's natural gas supply away from a centralized agency to a direct purchase contract with a creditworthy world-class producer under a firm supply, long-term base load and swing contract supported with Gulf Coast production. The contract supplies both the City's electric generation and its LDC natural gas supply needs. The contract permits physical gas supply at index, fixed price gas bundled with physical supply, and financial hedges of varying types. The transformation was achieved through a RFP process and bilateral contract negotiations.

#### **C. Northeast Texas Electric Cooperative Long-Term, In-Kind Natural Gas Hedging Review**

GDS worked closely with the Northeast Texas Electric Cooperative ("NTEC") to survey, analyze, and decide the merit of entering into long-term, in-kind natural gas hedges. This hedging could have included NTEC taking upstream positions in natural gas reserves, participating in drilling programs, and other highly structured in-kind hedges through long-term arrangements with natural gas producers, operators, natural gas reserve interest holders, or related investment and financial institutions with natural gas interest in the Gulf Coast region. Joint venture and other structured upstream arrangements were explored.

**D. CenterPoint Energy Long-Term Natural Gas Hedging Review and Related Filed Testimony**

GDS conducted an extensive review of CenterPoint's fuel risk management program including natural gas supply, processes, hedges, compliance, and results in a regulatory proceeding conducted by the Texas Public Utilities Commission. Discovery was performed, expert witness written testimony was prepared with findings and recommendations, and a deposition was taken.

**E. OG&E and PSO Utility Regulatory Proceedings in Oklahoma**

GDS was hired by the Oklahoma Attorney General's Office ("OAG") to advise the OAG in regulatory recent filings buy OG&E and PSO, two IOUs in the state of Oklahoma under the jurisdiction of the Corporation Commission of Oklahoma. GDS' scope of work included reviewing, analyzing, and making recommendations related to fuel issues including natural gas.

**F. Georgia Power Regulatory Filings at the Georgia Public Service Commission**

GDS has been selected by the Georgia Public Service Commission ("GPSC") to provide consulting services to the GPSC to be filed as part of Georgia Power's Integrated Resource Plans ("IRPs"). GDS provides comprehensive reviews of each IRP filing and also provides both written and oral testimony. A key area in the IRPs' filings is fuel supply, especially natural gas. This includes forward natural gas pricing, pricing curves, and related going-forward options available to Georgia Power. GDS also serves as the GPSC monitor for Georgia Power's going-forward long-term natural supply and delivery plans associated with Georgia Power's coal-to-natural gas generation plant conversions.

**G. University of Colorado-Boulder, Natural Gas Hedging and Procurement Review**

Dr. Schell has worked closely with the University of Colorado-Boulder ("CU-B") for the past six years providing guidance on natural gas hedging strategies for both direct use and in support of CU-B's cogeneration facility. Dr. Schell provides monthly natural gas market updates; natural gas transportation tariff review as needed; and, on-demand educational sessions for Facilities Management personnel on the mechanics of natural gas procurement, nominations, and imbalance management.

The work done for CU-B is similar to work that Dr. Schell had done previously for the University of Maryland-College Park ("UMCP"). Dr. Schell designed, issued, and assessed the results of an RFP for natural gas and power supplies for UMCP to support its cogeneration facility.

**H. Trigen Energy Corporation, Energy Risk Management and Fuels Management**

Dr. Schell oversaw the natural gas and power procurement and hedging activities of Trigen Energy Corporation's largest combined heat and power and district heating systems for three years. In her role as Director, Energy Risk Manager, she worked closely with the general managers at each of Trigen's major operating facilities to ensure that energy procurement and risk management procedures were in line with corporate objectives. Major facilities were located within the NYISO, PJM, and the Cinergy/Entergy markets.

## ON-POINT EXAMPLES OF SOME OF THE GDS TEAM EXPERIENCE WITH PUBLIC UTILITY REGULATORY EXPERIENCE

The key personnel on the GDS Team assigned to this project have been actively involved in the regulatory process in jurisdictions in both the United States and Canada. The specific public utility regulatory experience of each of the key personnel is summarized below, with additional detail provided in the individual resumes provided in Appendix A.

### A. Paul Wielgus: Previous Public Utility Regulatory Experience

Mr. Wielgus and Dr. Schell have worked closely together on behalf of the Utah Office of Consumer Services, as described more fully in the preceding section. In addition, Mr. Wielgus spent a large portion of his career working regulatory issues in various state jurisdictions. Mr. Wielgus' regulatory activities included utility rate filing support in Louisiana (Gulf States Utilities) and Texas, natural gas LDC rate and service issues in numerous states while a natural gas buyer for Frito-Lay's plants nationwide, as a developer of merchant power plants along the Gulf Coast including Louisiana (RS Cogen Project at PPG in Lake Charles) and Texas, and as a consultant for GDS. Some relevant cases as a consultant with GDS are:

- Oklahoma Corporation Commission Docket No. 201500208– PSO. Mr. Wielgus is examining the natural gas costs and issues under PSO's filing.
- Oklahoma Corporation Commission Docket No. 201400229 – OG&E IRP. Mr. Wielgus examined the natural gas plans and pricing under OG&E's IRP.
- Oklahoma Corporation Commission Docket No. 200300226 – OG&E. Mr. Wielgus examined the natural gas competitive bidding issues in OG&E's filing and testified.
- Texas PUC Docket No. 26195 – CenterPoint Reconciliation of Fuel Costs. Mr. Wielgus examined CenterPoint's natural gas hedging activities and filed testimony on his findings.
- Texas PUC Docket No. 29526 – CenterPoint Cost Recovery. Mr. Wielgus examined the cost associated with Company's long term energy contracts and filed testimony on his findings.
- Georgia PSC Docket No. 36498 – Georgia Power IRP. Mr. Wielgus examined the natural gas plans and pricing under Georgia Power's IRP. Mr. Wielgus examined the Company's natural gas plans and forward pricing and filed testimony on his findings.
- Georgia PSC Docket No. 36498 – Georgia Power IRP – natural gas follow up monitoring. As a result of the Georgia PSC IRP Order, Mr. Wielgus was appointed by the Georgia PSC to serve as the Staff's monitor of the Company's long term natural gas supply planning for the Company's coal to natural gas plant conversions.

### B. Lori Schell: Previous Public Utility Regulatory Experience

Dr. Schell spent six years employed as an in-house an expert witness working on interstate natural gas pipeline proceeding at the Federal Energy Regulatory Commission ("FERC") on behalf of Air Products and Chemicals, Inc., a large chemical and industrial gases manufacturer. Air Products had two flagship chemicals facilities located on the Gulf Coast, including one in New Orleans, Louisiana, and one near Pensacola, Florida. In additional, Air Products had a cogeneration facility located in Orlando, Florida.

Dr. Schell provided written testimony in rate cases involving Tennessee Gas Pipeline Company, Koch Gateway Pipeline Company, and Florida Gas Transmission. Dr. Schell worked closely with Air Products' Washington D.C.-based outside counsel in each of these FERC proceedings.

- Docket RP 95-362: Dr. Schell was one of the main witnesses against Koch Gateway's attempt to impose market-based rates on its pipeline system. Dr. Schell represented both Air Products and Sterling Fibers by providing several rounds of written testimony and defending her findings on oral cross-examination. The FERC denied Koch Gateway's attempt to impose market-based rates.
- Docket RP97-373: Dr. Schell was also a critical witness against Koch Gateway in successfully opposing Koch Gateway's attempt to switch from a postage stamp rate to zone-gate rates. Dr.

Schell represented Air Products and eight other industrial natural gas users in this FERC proceeding.

Dr. Schell served as an expert witness for the City of Calgary, Alberta, in Proceeding #2002-02 opposing the Regulated Rate Option (“RRO”) application of ENMAX Power Corporation. Dr. Schell provided written evidence showing that the RRO did not properly reflect market conditions and defended those findings on oral cross-examination. The RRO application was denied by the regulator.

Dr. Schell and Mr. Wielgus worked together in Docket No. 03-11019 before the Public Utilities Commission of the State of Nevada (“PUCN”) on behalf of the PUCN Regulatory Operations Staff. Dr. Schell provided the analytical support for testimony filed by Mr. Wielgus and another witness, with both witnesses recommending the disallowance of several natural gas and electricity hedges. The hedges were ultimately denied.

Dr. Schell served as an expert witness before the California Public Utilities Commission (“CPUC”) on behalf of the American for Solar Power (“ASpv”) in Docket No. R. 04-03-017. This docket had numerous phases, the most important of which was the development of a cost-benefit framework for distributed generation (e.g., rooftop solar photovoltaics). Dr. Schell provided an analysis and testified on the quantification of numerous attributes of solar photovoltaics (“PV”) in support of the CPUC providing ratepayer-funded incentives to move the PV market forward in California. This analysis is widely considered to have contributed to the subsequent approval by the CPUC of the highly successful \$2.3 billion California Solar Initiative incentive program for residential and commercial PV installations.

Dr. Schell and Mr. Wielgus have worked closely together on behalf of the Utah Office of Consumer Services, as described more fully in the preceding section.

### **C. Liz Grossman: Previous Public Utility Regulatory Experience**

Ms. Grossman provided initial credit consulting services to Con Edison Competitive Shared Services in 2011. Based upon satisfaction with Ms. Grossman's recommendations and the successful implementation of those recommendations at its subsidiary, Con Edison Company of New York retained Liz Grossman Consulting to do a best practice review at the regulated public utility in 2012. Due to the confidential nature of the consulting services, it is not possible to provide any detailed information regarding the specific tasks undertaken as part of the best practice review. However, Ms. Grossman's success is reflected in the fact that Con Edison Company of New York recently renewed the consulting relationship and Ms. Grossman currently assists in various aspects of Con Edison with Counterparty Credit Risk Management.

## 5 ESTIMATE OF COSTS

GDS will provide all the consulting services required to complete this project at a fixed rate not to exceed \$220/hour over the three-year term of this project.

GDS understands that it will only be allowed to charge for actual hours of work performed and expenses incurred. GDS further understands that expenses incurred will be reimbursed at state authorized rates as specified in Policy and Procedure Memorandum 49 issued by the State of Louisiana, Division of Administration, in effect at the time such expenses are allowed. All bills will be rendered in strict accordance with the Commission's guidelines. All budgets will be agreed to and preapproved by Staff. All budgets will be strictly adhered to.

## 6 CONFLICT OF INTEREST

None of the key personnel, either individually or as representatives of their respective companies, have any current conflicts of interests that would prevent them from representing the Commission in an unbiased manner.

None of the key personnel, either individually or as representatives of their respective companies, have any past employment that could possibly result in a conflict of interest in representing the Commission.

None of the key personnel, either individually or as representative of their respective companies, currently represent any clients before the Commission.

## 7 WHY GDS?

### ***Current On-Point Experience***

- **Hands-on commercial experience and expertise with long-term natural gas hedging**
- **Wide range of regulatory and jurisdictional expertise in natural gas hedging**
- **Extensive and comprehensive natural gas risk management experience**
- **Best practices counterparty and credit analysis expertise**
- **Gulf Coast, including Louisiana, natural gas supply and pricing experience**

GDS has comprehensive experience evaluating risk management programs for clients and hands-on experience on advising clients when these clients make decisions related to the commercial implementation of the client's risk management program. GDS has performed work in this area that includes municipals, cooperatives, and IOUs in the utility sector. The GDS Team's risk management review experience includes review of policies, procedures, and reporting, value at risk ("VaR") and to-expiration value at risk ("TeVar"), energy trading books and transactions, front to back offices, portfolio make up, instruments used, credit, and personnel and organizational structure. The GDS Team has advised clients on related commercial activities, performed risk management audits, serve as regulatory agency monitor on natural gas issues, and also provided expert witness testimony in various jurisdictions.

### ***Best Practices***

The GDS Team is familiar with current best practices for energy risk management hedging programs including those for regulated Electric IOUs. Each Electric IOU has its own unique set of conditions and issues. Risk management programs should address these unique conditions and issues appropriately, but underlying that are across-the-board best practices that should be applied to the energy risk management programs for all Electric IOUs.

### ***Financial Analysis Experience***

The GDS Team has the quantitative analysis capabilities to work thru the complexities of financial and physical trades and the books and systems where those trades are housed. The GDS Team has worked through different trading systems and, in one case, advised the utility as it underwent a transition from one trading system to another. Through the GDS Team's risk management work and energy supply procurement services, the GDS Team has extensive commercial experience, including modeling and presenting energy supply pro forma financial analyses (with the related credit analysis). This experience spans fuels (particularly natural gas), purchased power, renewable energy, system dispatch, and energy efficiency and demand response options for Electric IOU supply portfolio and risk management.

## 7.1 MINIMUM REQUIREMENTS

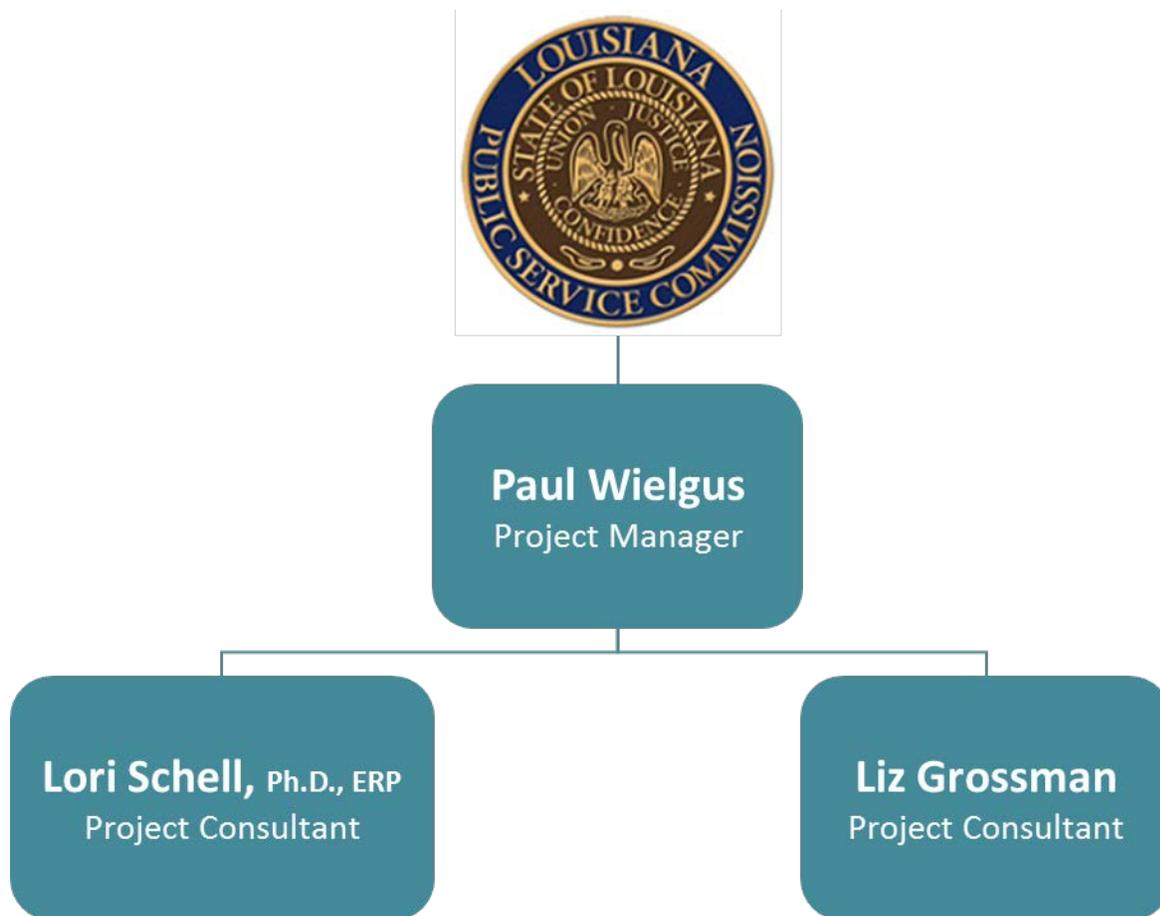
MINIMUM REQUIREMENT	GDS TEAM MEETS
<i>Understanding of the Commission's Hedging General Order (7/13/15)</i>	✓
<i>Understanding of the Commission's Purchase Gas Adjustment Order.</i>	✓
<i>Understanding of the Commission's Fuel Adjustment Clause Order.</i>	✓
<i>A general understanding of utility hedging practices.</i>	✓
<i>Experienced in the presentation of recommendations involving public regulation.</i>	✓
<i>Experienced in other regulatory issues on administrative and judicial levels.</i>	✓
<i>Previous experience in regulatory rulemaking processes, success on appeals, publications of a regulatory nature and educational achievement.</i>	✓
<i>Achievement and other previous employment in the matters involving the above areas.</i>	✓
<i>Significant personal experience before regulatory agencies such as the SEC, FERC, FCC, or other similar entities.</i>	✓

## 7.2 GDS PROJECT MANAGEMENT PRACTICES

1. Paul Wielgus, GDS Managing Director, will serve as the individual responsible for reviewing overall work assignments and project activities and he will serve as the executive Principal Contact for the Commission and its Staff for this project.
2. GDS will communicate with the Commission's project manager(s) on a regular basis as to the progress of the work, the results to date, and any problems or issues encountered. GDS suggests that a regular weekly conference call be held between GDS and the Commission Staff to discuss project progress and issues.
3. GDS will provide Commission Staff with drafts of all major deliverables for review, comment, and approval.
4. GDS will seek prior approval before undertaking any significant planning or development tasks. During the course of the GDS regulatory consulting project with the Commission, the GDS Team will seek ways to continuously improve our work and communications with the Commission, its counsel, and its Staff.
5. At the beginning of the project, the key GDS consultants will attend the kick-off teleconference with Staff to review the work plan and schedule. The GDS Team will communicate regularly by phone and e-mail with Commission Staff throughout this project.
6. The GDS Team will hold internal project staff meetings on a weekly basis to discuss work assignments and status, and any changes in the work plan, schedule, or individual assignments that may be necessary. Mr. Wielgus, as Principal Contact, will immediately report any delays or unforeseen difficulties to the Commission's project manager(s) if and when they develop.
7. The GDS Team will provide written project status reports to the Commission's project manager(s) per the schedule, summarizing but detailing project status by activity and identifying any difficulties or delays, and recommending corrective action, as needed.

8. Notes will be taken for all major meetings or teleconferences of the GDS Team and Commission Staff. Any work assignments or action items distributed at such meetings will be highlighted in meeting minutes. GDS Team members and appropriate Commission Staff will receive copies of these minutes.
9. GDS Team consultants will maintain copies of all time and expense records required by the Commission and will keep an accurate log of all hours worked on this project, as well as accurate records of travel and other expenses. GDS requires that its employees and consultants turn in receipts for all travel expenses and all non-labor expenses.
10. The GDS Team will make use of total quality management tools such as time lines, work schedules, budget reports, and percent work task completed reports to increase the efficiency and effectiveness of project management.
11. All deliverables will be subject to the GDS Team’s internal quality review, before being submitted to the Commission Staff.
12. The GDS Team will work very closely with the Commission’s project manager(s) to arrange meetings that are planned in the work plan.
13. All project presentations will be made available to the Commission’s project manager(s) for review before presentation.
14. The GDS Team will make it a high priority to respond to the needs of the Commission, its counsel, and its Staff as rapidly as possible.

### 7.3 ORGANIZATION CHART



## APPENDIX A | RESUMES OF KEY PERSONNEL

## PAUL J. WIELGUS

### EDUCATION:

Juris Doctorate, 1996, licensed in Texas  
South Texas College of Law, Houston, Texas

MBA, 1985, graduated with Honors, presented thesis on electric utility marketing to the IAEE North American Conference.  
Lamar University, Beaumont, Texas

MS, MINERAL ECONOMICS, 1979, awarded Federal Mining Fellowship.  
Thesis analyzed fuel transportation pricing and structures.  
West Virginia University, Morgantown, West Virginia

BS, ECONOMICS, 1977, energy economics concentration.  
West Virginia University, Morgantown, West Virginia

### EXECUTIVE PROFILE:

As Senior Executive in the energy industry, was engaged in the development and implementation of strategic business plans. Directed the start-up of multiple business units for top-tier industry players. Provided the strategic and commercial experience required to formulate the direction needed for the origination, approval, and closure of large capital projects and transactions including price hedges. This senior level commercial experience includes M&A work and asset operations. Currently utilizing business development and asset experience to provide energy advisory services to multiple clients. Skills set attributes include the following:

- Developed and implemented strategic business plans for various business units
- Recruited, formed, and led commercial teams to implement plans
- Facilitated plan approval with senior managements and Boards of Directors
- Leveraged industry network to advance business units' goals and objectives
- Negotiated successful commercial resolutions to overcome material setbacks
- Provided seasoned judgment to successfully move forward beyond critical path points
- Closed multiple capital projects and large long term structured transactions
- Secured fuel price hedges to support project financé and closing
- Marketed long term firm natural gas supply contracts including fixed price
- Experienced in managing operating assets and associated budgets
- Maneuvered successfully through required regulatory processes

### PROFESSIONAL EXPERIENCE:

**GDS ASSOCIATES, INC.**, Atlanta, Georgia

**2008 - Present**

#### **Managing Director**

Report to Vice President. Practice areas include energy project development and management, asset evaluation, natural gas, and energy risk management.

- Led development of \$200 million greenfield project from feasibility, thru Board approval, into start-up
- Negotiated full suite of OEM performance based arrangements, fixed price turnkey EPC contract, balance of plant equipment and installation contracts, lender approved long

term fuel contract, site purchase arrangement, power interconnects, water supply contracts, and agencies' approvals including permitting settlement

- Providing natural gas delivery and supply market feasibility analysis of adding natural gas for co-firing and full firing of operating project
- Secured natural gas interconnects, transport, and supply contracts for two greenfield projects
- Led transition and sourcing for two projects away from legacy interruptible natural gas arrangement to separate long term firm direct supply contracts
- Arranged multi-party natural gas deliveries and billings thru plant's single revenue meter
- Led LDC out of captive natural gas agency supply arrangement to new direct long term arrangement with major producer
- Negotiated additional long term firm fixed price transport for existing plant
- Serve as state agency monitor of one of the largest utility natural gas hedging book
- Serve as state agency monitor for natural gas planning and contracting of large utility's plant conversions to natural gas
- Serve as state agency natural gas expert in a large utility's IRP process
- Natural gas and project structuring expert team member in proposed public private partnership CHP project
- Provided expert witness services for natural gas industrial customer in contractual dispute with serving pipeline
- Provided fatal flaw analysis of converting waste to energy plant to natural gas
- Provided expert witness services in petroleum products pipeline dispute
- Negotiated fast track settlement for project owner with the project's natural gas generation units OEM

**NRG Energy, New Roads, Louisiana**  
**Vice President – Development**

**2006-2008**

Reported to Regional President. Developed and implemented project development and marketing plans for a 700 MW pulverized coal unit and a 200 MW pet coke, coal, and biomass fueled CFB repowering unit in Louisiana. Project accomplishments included:

- Led regional project development team
- Acquired multi-fuel signed permit for an estimated \$100 million repowering project
- Received project contingent offtake BoD approvals; included equity arrangements and long term offtake arrangements for the repowering project
- Team member in OEM vendor sourcing and contract negotiations, EPC sourcing and contract negotiations, and fuel sourcing initiatives
- High school mentor program participant

**GDS ASSOCIATES, INC., Atlanta, Georgia**  
**Managing Director**

**2002-2006**

Reported to founding partner. Developed and implementing a comprehensive risk management service targeted for electric cooperatives and municipals. Practice areas included energy assets and supply.

- Provided analysis and assessment of clients' plant capacity options and valuations including risk management
- Provided long term fuel and energy procurement advisory services including contract negotiations
- Replaced consultant to secure pipeline interconnect, pipeline lateral installation, and long term firm supply arrangement for project under construction

- Provided expert witness testimony in large electric and gas company rate proceedings in various states with emphasis on natural gas, plant valuations, fuel strategy, planning, and risk management
- Conducted management audit of large utility on behalf of state utility commission with emphasis on energy transactions

**ENTERGY WHOLESALE OPERATIONS, Houston, Texas**

**1999-2002**

**Senior Vice President - Business Management**

Reported to COO. Selected to head up newly created and expanded Business Management function responsible for the P&L and operations of a \$1.5 billion IPP asset fleet.

- Led newly created Business Management function and was responsible for the P&L and operations of a \$1.5 billion asset fleet
- Reorganized over 50 person staff which included a redesigned structure, re-staffing to upgrade talent, and new group and individual responsibilities and accountabilities
- Initiated a new management strategy for the asset team by adding the plants' commercial responsibilities to existing operational responsibilities achieving alignment of P&L and operational goals
- Led development and implementation of comprehensive corporate model to value, report and analyze business unit results, and formulated risk management policies and procedures

**Senior Vice President - Business Development**

Developed and implemented a strategic business plan for the startup of a regional asset development program targeted at a 10 state market.

- Developed and implemented a strategic business plan for the start-up of a regional asset development program targeted at the Gulf Coast region
- Recruited and hired senior commercial development professionals to staff the development teams and implement plan
- Directed teams that managed an on-going deal flow of 10 to 12 major projects in various stages of active development
- Led teams that closed three (LA, MI, TX) diverse, world scale natural gas projects totaling over \$800 million in capital in a two year period, two of which included joint venture partners, one fast tracked
- Projects completed included originating multiple natural gas interconnects, laterals, and transportation arrangements in the Gulf Coast region
- Company rep in all state PUC regulatory approval processes required for projects
- Collaborated effectively with company's trading joint venture to assist in projects' energy risk management activities
- Led commercial and operations efforts of company's thermal division
- Company campus MBA recruiting rep

**AMERICAN ELECTRIC POWER (AEP), Columbus, Ohio and Houston, Texas**

**1997-1999**

**Vice President - Project Development - North America**

Reported to Executive Vice President. Developed and implemented a strategic business plan for the North American market.

- Developed and implemented a strategic business plan for the North American market
- Recruited and hired commercial development professionals to staff the development team and implement plan
- Relocated and opened Houston, TX business development office, led Toronto, Canada office, collaborated with corporate office

- Member of team that led and closed company's first acquisition of a large natural gas pipeline asset in Louisiana
- Member of acquired natural gas asset's Board of Directors and responsible for asset operations and expansions
- Developed asset's first year operating and capital budget
- Exceeded the natural gas asset's acquisition proforma operating results during first year of ownership
- Led team that developed company's first domestic natural gas fired cogeneration project; project off of newly acquired pipeline in Louisiana
- Member of unregulated business development team for AEP's acquisition of CSW pre-announcement
- Company campus MBA recruiting rep

**ENRON CAPITAL AND TRADE (ECT), Houston, Texas**

**1991-1997**

**Director**

Reported to Vice President. Developed and implemented a wide range of commercial business strategies focused on growth opportunities.

- Developed and implemented a wide range of commercial business development strategies focused on new growth opportunities
- Recruited and hired commercial professionals to staff teams
- Led the long term contract origination team associated with marketing and selling to some of the company's largest electric utility natural gas customers; closed multiple structured transactions
- Led business development team in the approval, start up, and recruiting of coal supply trading business unit
- Member of LRC Pipeline (Louisiana) acquisition and integration team
- Member of Portland General Electric acquisition and integration team
- Led start-up of electric drive natural gas pipeline compressor services business unit
- Led state PUC commissions' regulatory affairs efforts including NARUC
- Started-up and led company's marketing services function
- Company campus MBA recruiting rep
- Junior Achievement volunteer at city high school

**PEPSICO (FRITO-LAY), Plano, Texas**

**1987-1991**

**Manager**

Developed and implemented a national business plan that transitioned the company's 40+ manufacturing facilities from regulated utility service to the then emerging unregulated direct purchase energy market including cogeneration.

- Recruited to develop and implement a national business plan that transitioned the company's 40+ manufacturing facilities from regulated utility service to the then emerging unregulated direct purchase natural gas market
- Leveraged purchasing power through consolidated contracting with targeted group of major energy producers to replace one off regulated purchases from utilities
- Negotiated all supply contracts, including pre-NYMEX fixed prices, and pipeline and LDC transport contracts
- Developed initial transport tariffs with some LDCs to implement transport to plant from pipeline
- Lobbied state PUCs to drive initiation and implementation of LDCs' transport service

- Facilitated, with senior management and plant personnel, the approval of numerous individual capital projects valued up to \$3 million per site to support direct purchase program
- Drove and implemented LDC bypass when necessary or as leverage in negotiating transport rate
- Responsible for development, including performance and variance, of annual corporate fuel price budget
- Trained in and implemented company's Future State business planning process
- Company campus MBA recruiting rep

**Gulf States Utilities (GSU), Beaumont, Texas**  
**Fuel Coordinator**

**1979-1987**

Reported to Director. Procured natural gas, fuel oil, coal, and uranium.

- Sourced and negotiated short-term and long term fuel contracts
- Secured natural gas supplies for company's power generation fleet and for its LDC in Louisiana
- Renegotiated long term contracts per scheduled price reopeners
- Represented company in joint ownership unit fuel contracts
- Participated in support of fuel cost recovery rate cases

**LORI SMITH SCHELL** 174 N. Elk Run • Durango, CO 81303 • 970.247.8181 • LSchell@EmpoweredEnergy.com

---

**LORI SMITH SCHELL, PH.D., ERP**  
**Independent Energy Consultant for Natural Gas, Renewables, Power & Emissions**

**SUMMARY**

President of Empowered Energy, a woman-owned consulting firm providing energy-related Economic, Market, and Regulatory Analysis, Commodity Procurement and Contract Management, Risk Management, and Expert Witness Testimony. Formerly directed fuels/electricity Hedging for a major Combined Heat and Power company. Additional management experience for energy-intensive industrial firm in Cogen Asset Management, Regulatory Affairs, Price Forecasting, and Market Analysis; Due Diligence for Cogen Project Finance. Federal-level Policy and Economic Analysis experience. Senior Fellow and Past President, United States Association for Energy Economics (USAEE). VP-Communications, International Association for Energy Economics (IAEE). Certified Energy Risk Professional (ERP).

**EXPERIENCE**

**EMPOWERED ENERGY [www.EmpoweredEnergy.com](http://www.EmpoweredEnergy.com) 2002-Present**

A Colorado-based energy consulting firm focused on natural gas, renewables, power & emissions.

- Prepared, delivered, and facilitated a two-day energy markets/policy training session to a predominantly Korean audience in support of fuel cell technology commercialization efforts.
- Multi-year support for Utah Office of Consumer Services analyzing PacifiCorp price hedging strategy for natural gas and electricity; filed related testimony and defended same at hearing.
- Energy consultant to University of Colorado-Boulder for natural gas purchases, appropriate natural gas and electric rate schedules, and economic feasibility of existing cogen operations.
- Directed fuels procurement and hedging strategy and negotiated fuels supply and transportation contracts for University of Maryland-College Park cogeneration project.
- Provided analytical support in Nevada Public Utility Commission prudency review of natural gas and purchased power procurement practices of two western U.S. electric utilities.
- Quantified benefits and costs of stationary fuel cells in distributed generation (DG) and backup power applications in support of DG tariff and ratepayer funding proceedings in California.
- Expert witness in California distributed generation cost-benefit analysis proceeding, focusing on solar photovoltaic potential for peak shaving; related effort to determine value proposition and emissions savings for fuel cells in baseload, backup, and specialty vehicle markets completed.
- Provided economic analysis for University of California-Irvine on cost impacts of maximizing renewable energy and cogeneration integration into existing university micro grid.
- Economic analysis for industrial customers in support of feed-in tariffs for combined heat and power and renewable energy in proceedings before the California Public Utilities Commission.
- Economic analysis of value proposition of large-scale solar power and solar water heating in support of ratepayer-funded incentives for same in California.
- Expert witness for Appalachian natural gas producer in three royalty cases; responsible for analyzing Plaintiffs' damages claims and for providing independent calculations of same.

- Attorney's consultant for natural gas price manipulation litigation in California; analysis provided basis for settlement agreement between proponents of several competing damages claims.
- Attorney's consultant for industrial end-user plaintiff in natural gas supplier performance contract dispute in the Midwestern U.S.; settlement agreement reached prior to arbitration.
- Provided MATLAB-based economic modeling and analysis to assess the economics of potential utilization scenarios for use of available biogas from landfills and wastewater treatment plants in California, including various electrical generation, direct use, and transportation fuel alternatives.
- Created levelized cost of energy economic model for University of California-Irvine project as part of technical and economic impact assessment of increased levels of renewables; included several demand response strategies (e.g., building precooling, lighting and fan turndown).
- Analyzed potential benefits of Clean Air Act opt-in program for energy-intensive industrial client.
- Provided analysis and damages calculations for two natural gas contract disputes involving sale of customer accounts and appropriateness of projected load profiles based on historical usage.
- Expert witness in Alberta electric rate case dealing with appropriate hedging mechanisms and cost allocation between regulated and retail rates; instrumental in \$14.8 million rate reduction. Participated in two subsequent, related rate cases, one of which went to negotiated settlement.

**TRIGEN ENERGY CORPORATION**

**1999-2002**

A New York-based combined heat & power company with 37 North American operating units specializing in energy efficiency, on-site cogeneration, trigeneration, and district energy systems.

***Director, Energy Risk Management, Project Advisory Group***

**2000-2002**

- Served on Board of Directors of Independent Power Producers of New York (IPPNY).
- Provided contractual support and oversight for electricity and primary energy purchases and sales for all Trigen operating units, including assessment of fuel arbitrage opportunities; major cogen facilities supported were located within the NYISO, PJM, and Cinergy/Entergy markets.
- Attempted QF contract restructuring for Trigen's flagship cogen facility (in PJM) to monetize the dispatch capabilities of the facility and maximize spark-spread arbitrage; lacked partner buy-in.
- Redesigned and negotiated changes to a contractual benchmark for a smaller cogen facility in PJM, avoiding immediate out-of-pocket fuel price exposure in excess of \$1 million.
- As head of Risk Management Committee, helped develop and implement corporate-wide risk management policy for electricity, fuels, and emissions allowances; responsible for related hedging and controls, mark-to-market determinations, and FAS 133 effectiveness tests.
- Directed commodity market analyses and issued electricity and primary energy forecasts for budgeting and hedging; provided final assurance to Risk Management Committee that proposed hedges were properly reflected in operating unit financial models and provided targeted returns.
- Set peak sales price in vintage 2003/04 NOx emissions allowances market as a result of optimization of corporate portfolio of Ozone Transport Commission-affected operating units.
- Directed timely statistical determination of and regulatory justification for replacement contract indices necessitated by unanticipated local distribution company (LDC) tariff changes.

***Director, Fuels Management, Division of Operating Assets***

**1999-2000**

- Supported business development and existing operating assets with commodity and basis market analyses, forecasts, and in-depth natural gas pipeline and LDC tariff rate assessment.

**AIR PRODUCTS AND CHEMICALS, INC.**

**1993-1999**

A Pennsylvania-based Fortune 300 producer of industrial gases and chemicals around the globe, with production costs for all major products dominated by volatile electricity and natural gas prices.

***Manager, Regulatory Affairs & Market Analysis, Corporate Energy* 1995-1999**

- Assessed potential benefits of renegotiating long-term natural gas supply agreement for a 120-MW Florida QF; managed natural gas supply and transportation (including capacity release).
- Developed and defended primary energy price forecasts as critical input to regional electricity price forecasts and corporate macroeconomic models.
- Responsible for intervening, testifying, and being cross-examined at the Federal Energy Regulatory Commission (FERC) in proceedings directly impacting natural gas pipeline transportation costs to flagship Air Products facilities. Major cases addressed (i) market power and market-based rates, and (ii) appropriate pricing of pipeline expansions.
- Demonstrated inappropriate cost-shifting impact of zone-gate rates on a network natural gas pipeline system for a nine-member industrial coalition. Maintained coalition's direction and consensus while negotiating a 20 percent discount to settle the case.
- Cross-examined to defend several rounds of written testimony that analyzed and critiqued the market power analysis of Koch Gateway in the first major market power case brought before the FERC. Favorable decision for intervenors was ultimately upheld by the D.C. Circuit Court.
- Advocated interruptible transportation rate design changes and opposed incremental AFUDC calculations for natural gas pipeline expansion capacity in written testimony at the FERC.

***Senior Principal Energy Analyst, Corporate Energy***

**1993-1994**

- Supported development efforts for QF facilities through fuel supply market analyses.
- Directed FERC interventions in four natural gas pipeline restructuring proceedings.

**BENJAMIN SCHLESINGER AND ASSOCIATES, INC.**

**1988-1993**

A Maryland-based boutique natural gas consulting firm providing project due diligence and natural gas market analysis, from exploration and production all the way downstream to the burnertip.

***Project Manager/Senior Economist***

**1988-1993**

- Provided contractual, regulatory, and deliverability risk evaluation (wellhead-to-burnertip) for a dozen project-financed natural gas-fired QF cogeneration units developed under PURPA.
- Assessed competitive market entry analyses for new gas supplies, including LNG.
- Performed market valuation to support buy-out of a major international gas supply contract.
- Optimized seasonal fuel supply pricing for two Florida municipalities using linear programming.
- Performed numerous multi-client analyses on hedging energy commodity price risk, relating existing natural gas spot markets to the (then-developing) natural gas futures market.
- Developed and presented a competitive natural gas pricing seminar in Bulgaria.

**U.S. DEPARTMENT OF ENERGY (DOE)**

**1985-1986**

Office of Policy, Planning, and Analysis, Division of Oil and Gas Analysis, Washington, D.C.

- Managed modeling input in support of Administration oil and gas policy initiatives; analyzed market impact of those initiatives and wrote associated position papers and briefings.

**LOS ALAMOS NATIONAL LABORATORY**  
Economics Group, Los Alamos, New Mexico

**Summers 1984/85**

- Oil & gas leasing program analysis; conservation assessment of Soviet steel making industry.

### **EDUCATION**

*Pennsylvania State University, Ph.D., Operations Research and Mineral Economics* 1988  
*University of Washington, B.A., Economics (Honors); elected to Phi Beta Kappa* 1979

Highly analytic; proficient in MATLAB, Microsoft Excel and Microsoft ACCESS.

### **PROFESSIONAL ORGANIZATIONS**

American Association of Petroleum Geologists (AAPG); Colorado Renewable Energy Society (CRES); Four Corners Geological Society (FCGS); Global Association of Risk Professionals (GARP); International Association for Energy Economics (IAEE); Leadership La Plata.

**LORI SMITH SCHELL, PH.D., ERP EMPOWERED ENERGY**  
174 N. Elk Run • Durango, CO 81303 • 970.247.8181 • LSchell@EmpoweredEnergy.com

---

**BIBLIOGRAPHIC C.V.**  
**(As of April 2015)**

**PUBLICLY  
AVAILABLE  
ANALYSES:**

“Build-Up of Distributed Fuel Cell Value in California: 2011 Update, Background and Methodology,” 24 July 2011, National Fuel Cell Research Center.  
[http://www.nfrcr.uci.edu/2/FUEL\\_CELL\\_INFORMATION/MonetaryValueOfFuelCells/Fuel\\_Cell\\_Value-Methodology\\_2011\\_FINAL\\_072411\\_Large-Units\\_Final.pdf](http://www.nfrcr.uci.edu/2/FUEL_CELL_INFORMATION/MonetaryValueOfFuelCells/Fuel_Cell_Value-Methodology_2011_FINAL_072411_Large-Units_Final.pdf)

“Small-Scale Solar Photovoltaics in California: Incremental Value Not Captured in the 2009 Market Price Referent – Description of Methodology,” 23 April 2010, California Solar Energy Industries Association.

“Value Proposition of Large-Scale Solar Power Technologies in California,” May 2009, Center for Energy Efficiency and Renewable Technologies.  
<http://www.ceert.org/PDFs/reports/LSSPValueProposition-0509.pdf>

“The Value Proposition of Solar Water Heating in California, January 2009, California Solar Energy Industries Association.

“Build-Up of Distributed Fuel Cell Value in California: Background and Methodology,” May 2008, National Fuel Cell Research Center.  
[http://www.nfrcr.uci.edu/2/FUEL\\_CELL\\_INFORMATION/MonetaryValueOfFuelCells/LargeFuelCellValue\\_May2008.pdf](http://www.nfrcr.uci.edu/2/FUEL_CELL_INFORMATION/MonetaryValueOfFuelCells/LargeFuelCellValue_May2008.pdf)

“PEM Fuel Cells: Value in California, Background and Methodology,” May 2008, National Fuel Cell Research Center.  
[http://www.nfrcr.uci.edu/2/FUEL\\_CELL\\_INFORMATION/MonetaryValueOfFuelCells/PEM\\_FuelCellValue\\_May2008.pdf](http://www.nfrcr.uci.edu/2/FUEL_CELL_INFORMATION/MonetaryValueOfFuelCells/PEM_FuelCellValue_May2008.pdf)

**REFEREED  
PAPERS:**

Brown, Tim M., *et al.*, “Economic Analysis of Near-Term California Hydrogen Infrastructure,” *International Journal of Hydrogen Energy* 38 (2013), pp. 3846-3857.

Eichman, Joshua D., *et al.*, “Exploration of the Integration of Renewable Resources into California’s Electric System Using the Holistic Grid Resource Integration and Deployment (HiGRID) Tool,” *Energy* 50 (2013), pp. 353-363 .

**TESTIMONY: Before the Public Service Commission of Utah:**

Docket No. 10-035-124: In the Manner of the Application of Rocky Mountain Power for Authority to Increase Its Retail Electric Utility Service Rates in Utah and for Approval of Its Proposed Electric Service Schedules and Electric Service Regulations, on behalf of the Utah Office of Consumer Services (OCS).

- Surrebuttal Testimony on the natural gas and electricity hedging practices of PacifiCorp Energy in connection with Rocky Mountain Power’s General Rate Case, July 19, 2011.
- Rebuttal Testimony on the natural gas and electricity hedging practices of PacifiCorp Energy in connection with Rocky Mountain Power’s General Rate Case, June 30, 2011.

- Direct Testimony on the natural gas and electricity hedging practices of PacifiCorp Energy in connection with Rocky Mountain Power's General Rate Case, May 26, 2011.

Docket No. 09-035-15: In the Manner of the Application of Rocky Mountain Power for Approval of its Proposed Energy Cost Adjustment Mechanism, on behalf of the Utah Office of Consumer Services (OCS).

- Oral Cross-Examination in defense of testimony and related calculations, August 17, 2010.
- Phase II, Part 1: Surrebuttal Testimony on the natural gas and electricity hedging practices and related metrics of PacifiCorp Energy, August 10, 2010.
- Phase II, Part 1: Direct Testimony on the natural gas and electricity hedging practices and related metrics of PacifiCorp Energy, June 16, 2010.
- Phase I: Direct Testimony on the natural gas and electricity hedging practices of PacifiCorp Energy, November 16, 2009.

**Before the Circuit Court of Roane County, West Virginia:**

*Estate of Garrison G. Tawney, etc., et al. v. Columbia Natural Resources, LLC*: On behalf of Columbia Natural Resources, LLC.

- Oral Cross-Examination in defense of damages calculations outlined in Expert Report, January 24-25, 2007.

**Before the California Public Utilities Commission:**

Docket R.04-03-017: On behalf of Americans for Solar Power (ASPV), funded in part by the National Renewable Energy Laboratory.

- Oral Cross-Examination in defense of cost-benefit framework proposed in written testimony, May 12, 2005.
- Reply Prepared Testimony supporting proposed cost-benefit framework and the inclusion of variables representing distributed value elements, April 28, 2005.
- Prepared Testimony on Itron Report on Framework for Assessing the Cost-Effectiveness of the Self-Generation Incentive Program, April 13, 2005.
- Opening Testimony on proposed cost-benefit framework for distributed generation, in support of distributed solar photovoltaic generation projects, October 4, 2004.

**Before the Public Utilities Commission of the State of Nevada ("PUCN"):**

Docket No. 03-11019: On behalf of the PUCN Regulatory Operations Staff.

- Provided analytical support for two witnesses filing Direct Testimony as part of a prudency review of Nevada Power Company for October 2002-September 2003; disallowance of several natural gas and electricity hedges was recommended.

**Before the Electrical Utility Regulation Committee, City of Calgary, Alberta:**

Proceeding #2002-02: On behalf of the General Manager, Corporate Strategy and Economics, City of Calgary:

- Oral Cross-Examination in defense of Written Evidence, April 10, 2003.
- Written Evidence opposing the Regulated Rate Option (“RRO”) Application of ENMAX Power Corporation as not properly reflecting market conditions, March 7, 2003.

**Before the New York State Energy Planning Board:**

Testimony on the Draft 2002 New York State Energy Plan on behalf of the Independent Power Producers of New York, Inc., February 5, 2002.

**Before the U.S. Federal Energy Regulatory Commission:**

Docket RP97-373: On behalf of Air Products and Chemicals, Inc., Akzo Nobel Chemicals Inc., Armstrong World Industries, Boise Cascade Corp., International Paper Co., Jefferson Smurfit Corporation (U.S.), Prior Energy Corp., Solutia Inc., and Sterling Fibers, Inc.

- Cross-Answering Testimony demonstrating cost-shifting impact of zone-gate rates proposed by Koch Gateway Pipeline Company, February 5, 1998.
- Prepared Direct Testimony arguing against the applicability of zone-gate rates proposed by Koch Gateway Pipeline Company, December 11, 1997.

Docket RP95-362: On behalf of Air Products and Chemicals, Inc., and Sterling Fibers, Inc. (successor to Cytex Industries, Inc.)

- Oral Cross-Examination in defense of Prepared Direct Testimony and Prepared Surrebuttal Testimony, October 18, 1996
- Prepared Surrebuttal Testimony calculating extent of the downward bias in the market power analysis of Koch Gateway Pipeline Company, August 12, 1996.
- Prepared Direct Testimony analyzing and critiquing the market power analysis of Koch Gateway Pipeline Company, April 11, 1996.

Docket RP95-112: Prepared Direct Testimony advocating interruptible transportation rate design changes applicable to Tennessee Gas Pipeline Company, on behalf of Air Products and Chemicals, Inc., September 26, 1995.

Docket FA94-15: Prepared Answering Testimony opposing incremental AFUDC calculations for expansion capacity by Florida Gas Transmission Company, on behalf of Orlando CoGen Fuel, Inc., and Orlando CoGen (II), Inc., April 25, 1996.

**DEPOSITIONS:** *Estate of Garrison G. Tawney, etc., et al. v. Columbia Natural Resources, LLC*. Natural gas royalty determination and payment dispute. Deposited by Plaintiffs’ counsel, Charleston, West Virginia, December 19, 2006.

*Sempra Energy Trading Corp v. Trigen-Syracuse Energy Corp*. Electricity power purchase contract dispute, prepped by King & Spalding, deposited by Sempra Energy Trading Corp. outside counsel, New York, New York, July 25, 2002.

- TRAINING:** “The ABCs of Energy Policy,” International Association for Energy Economics, 32<sup>nd</sup> Annual North American Conference, Anchorage, Alaska, July 2013.
- “The (Abbreviated) ABCs of Energy Policy,” Durango Chamber of Commerce Lunch & Learn, Durango, Colorado, November 2013.
- SPEECHES:** “Reforming the Energy Vision: New York State’s Response to Superstorm Sandy (Encore Presentation),” 2<sup>nd</sup> Annual Microgrid Global Summit, Irvine, California, March 2015.
- “The Future of the Electricity Market in a Diversified Grid,” International Colloquium on Environmentally Preferred Advanced Power Generation (ICEPAG) 2015, Irvine, California, March 2015.
- “Reforming the Energy Vision: New York State’s Response to Superstorm Sandy,” Latin American Association for Energy Economics, 5<sup>th</sup> Biennial Conference, Medellin, Colombia, March 2015.
- “Unraveling the Paradox: The Economics of Using Otherwise Wasted Heat for Chilling,” International Association for Energy Economics, 37<sup>th</sup> International Conference, New York, New York, June 2014.
- “Natural Gas and Renewables: Bridge to the Future or Death Knell?,” BIT’s 1<sup>st</sup> Frontier Industrial Forum-2013, Qingdao, China, October 2013.
- “Support Mechanisms for Low Carbon Technologies,” Plenary Session, International Association for Energy Economics European Conference 2013, Düsseldorf, Germany, August 2013.
- “Back to the Future? The Evolution of the North American Natural Gas Market,” Latin American Association for Energy Economics, 4<sup>th</sup> Biennial Conference, Montevideo, Uruguay, April 2013.
- “Show Me the Numbers! Real-World Quantification of Energy Technology Attributes,” Women’s Energy Network, 1<sup>st</sup> Biennial Conference, Houston, Texas, April 2013.
- “Where Cars are King: The Economics of Transitioning to Hydrogen Filling Stations in California,” International Association for Energy Economics, 31<sup>st</sup> Annual North American Conference, Austin, Texas, November 2012.
- “The ABCs of Energy Policy,” The Pagosa Verde Symposium, Pagosa Springs, Colorado, August 2012.
- “Increased Renewables in California: Impact on Fossil Fuel Generation, Levelized Costs, and CO<sub>2</sub> Emissions,” International Association for Energy Economics, 35<sup>th</sup> Annual International Conference, Perth, Australia, June 2012.
- “Technical and Cost Impacts of Integrating Renewables: A Case Study for California,” International Association for Energy Economics, 30<sup>th</sup> Annual North American Conference, Washington, DC, October 2011.
- “Quantifying the Value of Distributed Fuel Cells in California: A Case Study,” 4<sup>th</sup> World Hydrogen Technologies Convention, Glasgow, Scotland, September 2011.
- “Renewables and LPEA: The State of the Notion,” La Plata Electric Association Board Meeting, Durango, Colorado, April 2011.

“The Importance of Being Earnest (or How to Inform the Policy Debate),” ICEPAG 2011, Costa Mesa, California, February 2011.

“Cap-and-Trade vs. Carbon Tax: What’s Ahead for California?” ICEPAG 2011, Cost Mesa, California, February 2011.

“Clearing the Air: Cap-and-Trade vs. Carbon Tax,” International Association for Energy Economics, 29<sup>th</sup> Annual North American Conference, Calgary, Alberta, October, 2010.

“California’s Market Price Referent: Setting the Bar for Renewables,” University of California-Irvine, Distinguished Energy Lecturer, Irvine, California, May 2010.

“The Cost Effectiveness of Distributed Generation with and without CHP/CCHP,” ICEPAG 2010, Costa Mesa, California, February 2010.

“Maximizing the Efficiency of Natural Gas Use: The Case for Solar Water Heating,” 24<sup>th</sup> World Gas Conference, Buenos Aires, Argentina, October, 2009.

“Cap-and-Trade vs. Carbon Tax: Clearing the Air – Localizing the National Debate,” Green Business Roundtable, Durango, Colorado, September 2009.

“Concentrating on the Future: The Benefits of Large-Scale Solar Technologies,” International Association for Energy Economics, 32<sup>nd</sup> Annual International Conference, San Francisco, California, June, 2009.

“Economic Analysis of Large Stationary Fuel Cell Value in California,” ICEPAG 2009, Newport Beach, California, February, 2009.

“Value Proposition of Solar Photovoltaics and Fuel Cells in California,” 65<sup>th</sup> Annual Convention, National Congress of American Indians, Phoenix, Arizona, October, 2008.

“Solar Photovoltaics and Fuel Cells: Valuing the Contribution of Distributed Energy Resources to the State of California, U.S.A.,” 19<sup>th</sup> World Petroleum Congress, Madrid, Spain, June, 2008.

“Monetizing the Value Proposition for Emerging Advanced Power Generation Markets: A Case Study for California,” ICEPAG 2008, Newport Beach, California, February 2008.

“Revealing the ‘Hidden’ Benefits of Distributed Generation,” International Association for Energy Economics, 27<sup>th</sup> Annual North American Conference, Houston, Texas, September, 2007.

“NYMEX Natural Gas Futures: The Wild Ride Continues,” International Association for Energy Economics, 26<sup>th</sup> Annual North American Conference, Ann Arbor, Michigan, September, 2006.

“Impact on Global LNG Markets of Balancing the North American Natural Gas Market,” 18<sup>th</sup> World Petroleum Congress, Johannesburg, South Africa, September, 2005.

“Optimizing Incentive Programs for Renewable Energy,” INFORMS Conference on O.R. Practice: Applying Science to the Art of Business, Palm Springs, CA, April, 2005.

“Balancing the North American Gas Market,” Plenary Moderator, International Association for Energy Economics, 23<sup>rd</sup> Annual North American Conference, Washington, DC, July, 2004.

"Risk Management in Volatile Energy Markets: Focus on Natural Gas," Four Corners Oil & Gas Conference, Farmington, NM, May, 2004.

"Risk Management in Volatile Energy Markets: Focus on Natural Gas," Reusable Industrial Packaging Association Annual Meeting, San Antonio, TX, October, 2003.

"Identifying the *Real* Risks of Selling Financially Firm Power," International Association for Energy Economics, 22<sup>nd</sup> Annual North American Conference, Vancouver, BC, October, 2002.

"When Is A Monopolist No Longer a Monopolist?," International Association for Energy Economics, 18<sup>th</sup> Annual North American Conference, San Francisco, CA, September, 1997.

"The Incremental vs. Rolled-In Pricing Debate," *Gas Daily's* End-User Strategies Conference, Houston, TX, March, 1995.

"Natural Gas Pricing: Spot Markets vs. Long-Term Contracts," 5<sup>th</sup> Annual New Mexico Gas Marketing Conference and Trade Fair, Santa Fe, NM, May, 1992.

"The Transition to Open-Access Storage in U.S. Natural Gas Markets," IAEE, 12<sup>th</sup> Annual North American Conference, Ottawa, Ontario, October, 1990.

"Profit-Maximizing Utilization of Transmission and Storage Capacity by a Regulated Natural Gas Pipeline Firm," ORSA/TIMS Joint National Meeting, New York, NY, October, 1989.

"Whither Gas Supply Realignment Costs?," *Gas Daily's* Natural Gas Industry Restructuring Conference, Houston, TX, September, 1989.

**PAPERS:**

"Quantifying the Value of Distributed Fuel Cells in California: A Case Study," 4<sup>th</sup> World Hydrogen Technologies Convention, Glasgow, Scotland, September 2011.

"Maximizing the Efficiency of Natural Gas Use: The Case for Solar Water Heating," 24<sup>th</sup> World Gas Conference, Buenos Aires, Argentina, October, 2009.

"Solar Photovoltaics and Fuel Cells: Valuing the Contribution of Distributed Energy Resources to the State of California, U.S.A.," 19<sup>th</sup> World Petroleum Congress, Madrid, Spain, June, 2008.

"Effectiveness of Varying PV Incentive Program Structures," with Shirley J. Neff, International Association for Energy Economics, Executive Summaries of the 29<sup>th</sup> IAEE International Conference, Potsdam, Germany, June, 2006.

"Natural Gas Prices: Who's Driving this Rollercoaster?," EnergyPulse online publication, [http://www.energypulse.net/centers/article/article\\_display.cfm?a\\_id=878](http://www.energypulse.net/centers/article/article_display.cfm?a_id=878), December, 2004.

"Electricity Prices in Alberta: Is the Future in the Past?," International Association for Energy Economics, Proceedings of the 23<sup>rd</sup> Annual North American Conference, Mexico City, Mexico, October, 2003.

"Profit-Maximizing Utilization of Transmission and Storage Capacity by a Regulated Natural Gas Pipeline Firm," Ph.D. Dissertation (GAMS-based non-linear programming model) , December, 1988.

“Technical Characteristics of Soviet Iron- and Steelmaking Complexes,” (with Robert W. Shultz), LA-UR-85-3894, Los Alamos National Laboratory, Los Alamos, NM, 1985.

**POSTERS:** “Quantifying the Value of Distributed Fuel Cells in California,” World Hydrogen Technologies Convention 2007, Montecatini Terme, Italy, November, 2007.

**ARTICLES:** “Solar Peaking,” with Shirley J. Neff, *Energy*, Business Communications Co., Inc., Spring 2005, pp. 40-42.

**Elizabeth (Liz) Grossman**  
121 Riverbend Drive  
Peekskill, NY 10566  
**(917) 774-0147**

## **EXPERIENCE**

### **6/11-Present Liz Grossman Consulting**

Consulting assignments draw upon 30 years industry experience and range from “best practice” risk policy/process reviews to counterparty credit reviews.

**Training Consultant for FitchLearning:** Business of Banking, Key Concepts of Credit Risk, Fundamentals of Bank Financial Statement Analysis, Intensive Bank Analysis, Advanced Bank Analysis, Emerging Market Bank Analysis, Introduction to Dodd Frank, Risk Management in Banks, Sovereign Analysis. In addition to classroom training, assist in the development of exercises and case studies used in various seminars.

Co-Author: **Bank and Sovereign Risk Analysis**, Euromoney Books, 2014

### **5/03-6/11 Deutsche Bank, Director, Team Head, Credit Risk Management**

Dual-hatted employee of both Bank and lead Broker Dealer. Responsible for \$28 billion North American Financial Institutions Portfolio. Managed staff of Credit Officers and assisted Financial Institutions training for graduate program. Reviewed credit analysis and approved transactions including credit extension for traditional lending as well as traded products lines. Held Senior Credit Officer delegation authority. Determined credit terms for documentation. Prepared and presented portfolio reviews/reports to senior management. Served as the credit department representative on the New Product Approval Committee which often required interaction with front and middle office to evaluate the risks associated with potential new products. Interacted with various regulators and auditors.

### **2001-5/03 BNP Paribas, Vice President, Credit Risk Management**

Responsible for North American Bank and Broker Dealer Portfolios. Developed North American Banks and Broker Dealers lending policy. Conducted counterparty analysis and recommended credit terms for ISDA documentation. Assisted in due diligence on Bank of the West acquisition. Monitored market and regulatory developments and prepared reports on such for Senior Management. Served as the credit department representative during Patriot Act KYC compliance development and implementation.

### **1999-2001 Bear Stearns, Associate Director, Global Credit Department.**

Responsible for Broker Dealer Portfolio. Conducted counterparty analysis and coordinated documentation to enable credit lines for Derivatives, Foreign Exchange, Stock Loan, Mortgage-Backed Securities, Repurchase Agreements and Futures.

**1998-1999 Sakura Global Capital, Inc., Deputy Department Head, Vice President**

Evaluated the creditworthiness of a variety of potential counterparties: Foreign and Domestic Banks, Corporates, Broker Dealers, Insurance Companies, Agencies, SPV's and Sovereigns. Instrumental in the development of the Credit Policy Manual. Assisted the Department Head with internal and regulatory audits. Ran department when Department Head away.

**1990-1998 RCFM Inc. , Vice President**

Completed various consulting assignments regarding credit training, design and analysis.

**1988-1990 Cates Consulting Analysts Inc., Vice President**

Analyzed and rated financial institutions. Developed curriculum and instructed both Bank and Thrift financial analysis courses. Worked on bank shareholder valuation due diligence.

**1984-1988 E.F. Hutton & Company, Inc., Taxable Fixed Income Credit Analyst**

Analyzed Broker Dealers, Banks, Thrifts, Mortgage Bankers, Funds, Industrials, Insurance Companies and Government entities to determine appropriate firm-wide exposure and appropriate internal rating.

**1982-1984 Prudential Bache Securities, Commodity Credit Analyst**

Analyzed counterparties to determine suitability and appropriate commodity credit limits. Responsible for New York Metropolitan region counterparties.

**EDUCATION**

**1983-1987 Lubin Graduate School of Business, Pace University.**

Masters of Business Administration in Finance, Fall 1987 (evening student while employed full time). Selected, by faculty, for The International Honor Society in Business Administration and The Economic Honor Society. Thesis: Risks of Collateralized Mortgage Obligations.

**1982 State University of New York at Binghamton.** Bachelor of Science in Management, with academic concentrations in Finance and Economics.

**Licenses:** Series 7 and Series 63 (expired)

**Affiliations:** Treasurer, Homeowners Association

## APPENDIX B | GDS RELEVANT SERVICES

Overall Services

Natural Gas Services

Risk Management Services

Decision Advisory Services



**OUR MISSION:** To help our clients succeed by anticipating and understanding their needs and by efficiently delivering quality services with confidence and integrity.

## The Smart Choice in Utility & Energy Consulting

Since 1986, GDS has been providing solid engineering and energy consultant services throughout the U.S. The size and depth of our firm permits us to offer clients multiple sources for assistance, ensuring **complete, competent, and timely service.**

We understand that our clients want to get it right the first time. Whether you are in the business of **electric, gas, water** or **wastewater** utilities, we know your time and resources are valuable. Our goal is to be a wise investment for you, while ensuring the consistent quality that is the foundation of our long-term relationships.

We serve a diverse client base with a variety of energy consulting services, as well as information technology, market research, and statistical services.

Our consultants are recognized leaders in their respective fields, dedicated to their clients, innovative in their approach to meeting unique challenges, and known for consistently being available when needed.

**We're ready to show you the difference** that over 28 years of experience can make.

### CORE VALUES:

- We endeavor to identify, then meet or exceed our clients' needs
- We gauge our overall success in terms of our clients' success, by promoting a partnership perspective
- We will conduct our practice at all times with honesty and integrity
- Our consulting staff will possess the requisite knowledge and experience to solve our clients' problems
- Our services will be competently performed and our work product will be presented in a professional, understandable manner
- Our financial success is founded on long-term client relationships, proficient project management and efficient infrastructure
- We encourage professional development of our employees by providing opportunities for challenging work
- We promote a working environment of mutual respect and cooperation among our employees

GDS Consulting Services are listed on the following page.



Our long history of meeting client needs has established our reputation within the industry. In fact, most of our project assignments are derived from repeat work for existing clients or from client referrals.

Drawing upon many years of experience in problem-solving for both utility and non-utility clients, we have developed a keen insight into the causes and cures of our clients' challenges.



**We deliver “right-fit” solutions for each client’s particular situation.**

### **GDS CONSULTING SERVICES INCLUDE:**

#### **ENERGY SUPPLY**

Power Supply Planning  
Generation Services  
Renewable Energy Sources,  
Distributed Generation, & CHP  
Energy Procurement

#### **NATURAL GAS**

Natural Gas Consulting

#### **TRANSMISSION**

Operations/Regulatory Planning  
NERC/ERO Compliance

#### **UTILITY DISTRIBUTION SERVICES**

Planning, mapping, design, and training services are provided through our Hi-Line Engineering division.\*

#### **ENERGY USE & EFFICIENCY**

Energy Efficiency & DSM  
Residential EE Consulting  
Industrial & Commercial  
Agricultural  
Municipal  
Hospitality Industry  
Public Housing Authority

#### **ENVIRONMENT & SAFETY**

Environmental Services & Management  
Carbon Compliance Services  
Clean Power Plan

#### **FINANCIAL/RATES/LOAD**

Rate, Regulatory & Financial  
Load Forecasting & Statistics  
Risk Management Services  
Municipal Financial Services  
RTO Settlement & Scheduling Services  
Regulatory & Restructuring Services

#### **OTHER SPECIALIZED SERVICES**

Information Technology  
Water & Wastewater Utility Consulting  
Utility Privatization

[gdsassociates.com](http://gdsassociates.com)

\*Hi-Line Engineering, a division of GDS Associates, offers planning, mapping, and design services to the electric utility industry. They provide high-quality, personal service to rural electric cooperatives, investor-owned utilities, municipalities, and the U.S. military.

Hi-Line also offers in-depth training courses geared to the electric utility industry all across the U.S. and via webinars.



For more information, contact **Paul Wielgus** at 770.799.2461 or [paul.wielgus@gdsassociates.com](mailto:paul.wielgus@gdsassociates.com)



## Natural Gas Consulting Services

The GDS team of highly qualified professionals work to address complex economic, engineering, accounting, policy, and regulatory issues with clients including consumer groups, publicly-owned utilities, regulatory authorities, military and government agencies.

### UTILITY RATE ANALYSIS/STUDIES

GDS conducts rate analyses and studies to determine the fairness and financial foundation of rate structures. We can evaluate, establish, and revise natural gas rates to meet increased costs of providing service and implementing regulatory initiatives, while balancing the requirements of the company and its customers. Several of the professionals at GDS are skilled witnesses who have provided expert testimony on a wide range of rate case topics and issues. Our services include:

- Cost of service studies
- Expert testimony
- Rate design evaluation
- Rate studies
- Rate case evaluation
- Cost of capital analyses
- City gate purchases
- Service rules and regulations
- Transportation rates

### INNOVATIVE STRATEGIES AND SOLUTIONS

GDS offers specialized consulting to guide our clients through every stage of the planning and implementation cycle. We use our expertise to identify issues and develop strategies that result in solutions to the challenges created by today's constantly changing market. We assist our clients in the following areas:

- Merger and acquisition valuation (including technique selection)
- Industry restructuring
- Risk management (hedging, policy development, etc.)
- Financial analysis and competitive analysis
- Energy procurement strategies and negotiations assistance
- Unbundling services
- Plant conversion to natural gas

### GASB 34 COMPLIANCE SERVICES

The engineering and accounting staff at GDS can assist municipal utilities in evaluating GASB 34 and how it may impact utility services. Based on client needs, we will:

- Review and/or modify depreciation methods
- Evaluate whether the "modified approach" is a practical option
- Review and improve capitalization policies and procedures
- Assist in the formulation of an asset management plan and long-term asset maintenance strategies
- Assist financial personnel with the MD&A

### CLEAN POWER PLAN

GDS can help in navigating through the implementation:

- Impact analysis
- Conversions
- Regulatory intervention





## GDS Associates, Inc.

Energy markets are inherently risky, and recent years have proven just how risky they are. Market liquidity is decreasing, credit and transaction costs are increasing, and volatility in the market continues. The energy business is in a state of flux with no certainty in sight. To maintain their responsibility to their stakeholders, buyers, sellers, and other market participants should strive to fully understand and manage their enterprise's risks in this uncertain environment.



## Risk Management Services

Organizations can help achieve their goals in this volatile and uncertain business environment by implementing an effective risk management program. This program involves identifying, evaluating, and mitigating the risks that threaten your business goals. We can design a risk management program that will assist your leadership team with this challenge.

GDS understands that risk management is more than energy price management, more than regulatory compliance, and that each client faces a unique set of risks and challenges. To fully understand and mitigate these risks and their impact on your cost structure, your leadership team should have a complete view of these exposures.

Our approach incorporates quantitative and qualitative techniques to capture, assess, measure, evaluate, and mitigate the risks that can impact your objectives and ultimately your bottom line. We can do parts of this process for you or all of it.

### OUR COMPREHENSIVE APPROACH

- Develop multi-year financial model and forecast
- Identify and quantify risks in all business segments that can impact these forecasts
- Perform, when appropriate, a probability analysis of the risks using simulation techniques
- Conduct a Cash-Flow-at-Risk analysis to determine financial impact
- Utilize a Risk Matrix as a tool for developing a risk mitigation work plan

### OUR SEPARATE PRODUCT OFFERINGS

- **Risk Assessment** – Risk identification and measurement, including forecasted multi-year financial statements
- **Risk Matrix** – Proactive management plan used to mitigate each risk
- **Risk Policies/Procedures** – Custom tailored guidelines and directives to ensure program compliance
- **Risk Advisory** – As needed input or assistance
- **Virtual Chief Risk Officer** – Ongoing advisory services that incorporate all of the above

### OUR OVERALL CAPABILITIES

- We have extensive capabilities to provide a comprehensive approach to risk management – a full line of services
- We have the risk intelligence expertise needed to identify the exposures that can impact all segments of your business
- We have a proven track record of assisting leadership teams in meeting the challenges of maneuvering successfully through their segment of the industry

For more information, contact **Paul Wielgus** at 770.799.2461 or [paul.wielgus@gdsassociates.com](mailto:paul.wielgus@gdsassociates.com)





Navigating in the energy markets is challenging. It's a task that can be daunting. With every day, every month, and every year, there are decisions to be made. Models are run, analyses are performed, and meetings are held. Whether it's strategic or tactical, short-term or long-term, human capital or capital assets, buy or build, the options are numerous and the consequences can be material and long lasting. Organizations owe it to their stakeholders to make the best decisions they can.



## Decision Advisory Services

Organizations are more likely to achieve their goals by making the best decisions they can. Decision making is by far the lowest cost component of the total cost and consequences of any important decision an organization makes. Sometimes organizations don't have the full complement of resources that can help lead to the best decision, and even if their resources match the task, additional experience and input might just be the needed ingredient. Very often, a second opinion or an alternative point of view can be invaluable to the process and the ultimate end result.

GDS understands that organizations sometimes need only specific experienced input, a quick critique of the process, or just a sounding board. GDS can provide the specific decision making help your organization needs. We can customize the best fit to enable your organization to make the best decision. Whether it's assisting with the decision analysis, working with the team conducting the analysis, collaborating with senior management, or advising the organization's board of governance, GDS can help.

Our decision advisory service can incorporate quantitative and or qualitative processes, can be collaborative or one on one, or it can be a process audit to identify improvements for use by the organization in its decision-making going forward.

### OUR EXPERTISE

- Project analysis
- Valuation
- Life cycle costs
- Modeling
- Risk analysis
- Negotiations
- Contracting

### OUR OFFERINGS

- Experienced input
- Supplemental service
- Analysis team support
- Collaboration
- Advisory
- Process audit
- Expert testimony

### OUR CAPABILITIES

- We have extensive capabilities to provide the complementing services
- We have the subject expertise needed to add value
- We have a track record of assisting leadership teams in meeting the challenges of maneuvering successfully through their decision process

For more information, contact **Paul Wielgus** at 770.799.2461 or [paul.wielgus@gdsassociates.com](mailto:paul.wielgus@gdsassociates.com)



## APPENDIX C | NATURAL GAS DILEMMA AND RTOs ARTICLE

# TRANSACTIONS

a Publication of  GDS Associates, Inc.

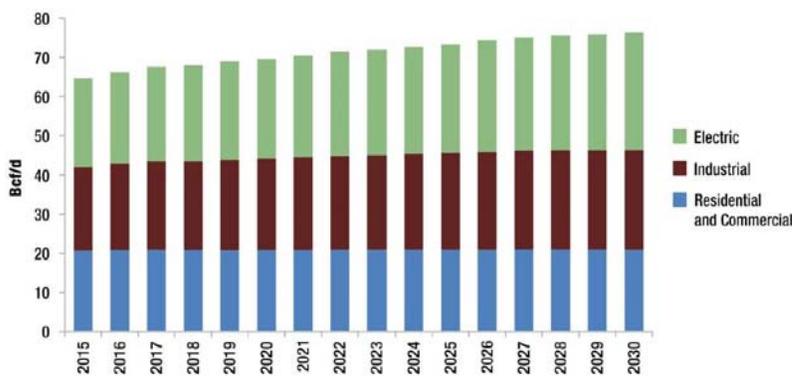


## THE NATURAL GAS DILEMMA EDITION

Proven shale gas reserves and fracking technology have dramatically changed the production capability for natural gas and the anticipated utilization of natural gas. *Energy Tomorrow*

touts the U.S. as a world power in natural gas, supported by the largest energy infrastructure in the world, and utilization of natural gas in the U.S. has increased markedly over the past few years. The high levels of production, combined with the recent relatively low price levels, have made this commodity very attractive to various consuming sectors. Most notably, the power generation and industrial sectors are consuming more natural gas than ever before and are expected to continue increasing their consumption of this commodity.

Figure 1. Natural Gas Consumption



Source: DOE Feb 2015 "Natural Gas Infrastructure Implications" Report

same time, the U.S. is transitioning from being a modest importer of natural gas to becoming a significant exporter in the form of LNG. Although natural gas will not be the only fuel source for meeting all of the growth in the power generation sector, the growth in renewable power resources implicitly relies on natural gas resources to provide reliability support due to the intermittent nature and limited availability of existing renewable energy technologies. But as these upward trends are merging with other trends there is the potential to create discontinuities in the natural gas market.

### Pipeline Investments

Growth in natural gas production varies significantly across the U.S. supply regions, which will create changes in the historical natural gas flows between the regions. This shift in deliverability is requiring investment and realignment of midstream and long haul pipeline infrastructure. The strongest growth of natural gas production occurred in the East fueled by the Marcellus Shale, followed by the Gulf Coast onshore region and then the Dakotas/Rocky Mountains region. Interregional flows serving downstream markets are beginning to vary significantly and thus, will require new asset investments in pipelines.

The EPA's proposed Clean Power Plan adds to the popularity for the power generation sector and some estimate that there will be \$100 billion worth of natural gas reliant industrial projects built along a swath that reaches from Texas eastward to Baton Rouge, Louisiana. At the



JUN/JUL 2015

## JACOBS NAMED ENR'S TOP 25 NEWSMAKERS

GDS congratulates our very own, Bill Jacobs for his recognition in the Engineering News-Record's (ENR) annual Top 25 Newsmakers program. This award is in recognition for Bill's crucial role in Georgia Power's Plant Vogtle nuclear expansion project. Click [HERE](#) to view the GDS article.



## UPCOMING CONFERENCES

**AUGUST 11-13**  
IEPEC Annual Evaluation Conference  
Long Beach, California

**AUGUST 25-27**  
AESF Summer Conference  
Niagara Falls, Canada

## UPCOMING WEBINARS

**JULY 7**  
NESF Clearances on Structures

**JULY 14**  
Mitigation of Lightning Induced Outages

**AUGUST 11**  
NESF Clearances for Joint Use with Communication

**AUGUST 11**  
New Trends in Overcurrent System Protection

**Note:** All webinars are recorded and are available for viewing post-presentation.

Richard Kinder, chairman and CEO of the natural gas infrastructure giant Kinder Morgan, during a keynote address at the recent IHS CERAWEEK in Houston, said the growth of production in the Marcellus Shale in the last several years has had a profound effect on the flow of the commodity, which historically has flowed from the producing regions of Louisiana and Texas to markets in the Northeast. Kinder Morgan owns four major interstate gas pipelines that stretch from the Gulf Coast region of Texas and Louisiana to market areas in the Northeast. Kinder noted that his company has turned three of the pipelines around to move gas down to the Gulf Coast and the fourth one is now seeking approval to be converted into a liquids pipeline. Kinder said much of the gas from the Marcellus Shale is selling at a discount to other regions because of the shortage of pipeline infrastructure to bring it to market. FERC Commissioner Moeller, at a recent speaking engagement, stated the following regarding pipeline capacity: "When it's really, really needed and everybody wants it . . . that's when we have to be concerned about it".

**Production Infrastructure**

To appreciate the impact of shale gas and fracking technology, the state of Pennsylvania (because of the Marcellus Shale) ranks 8th in the world in terms of production, even more than Saudi Arabia. The Marcellus Shale region overall produces about 20% of total U.S. natural gas production. **Given the ramp up in the Marcellus Shale, Pennsylvania is poised to take the #2 spot in terms of total U.S. production behind Texas.** Production from the Marcellus Shale region is now displacing inflows from the Gulf coast, the Midwest, and Canada. Bottom line is that this makes the state of Pennsylvania a swing state in terms of natural gas supply and prices. What happens in the Marcellus region now measurably impacts all of the U.S. natural gas market including Henry Hub prices. "The Marcellus has been a game changer in terms of production, reserve potential, everything," said Fadel Gheit, a senior energy analyst for Oppenheimer & Co. in New York.

However, with the current low natural gas prices, the drilling rig count in the Marcellus Shale region has been decreasing since 2012. For example, rig counts peaked at around 140 in 2012 and has recently slipped to the mid-70s according to Baker Hughes' tracking report. One of the largest Marcellus gas producers reported a recent quarterly loss of over \$220 million and a 60% decline in profits for the year as

well as announcing they were implementing a reduction in drilling. According to the Texas Railroad Commission, natural gas deliverability from all three shale fields in Texas is leveling out. Because the majority of natural gas is produced in association with natural gas liquids and crude oil, the recent fall in crude oil prices is causing a double whammy for natural gas' deliverability outlook and adding to the discontinuity in the market. Forward natural gas prices aren't helping producers because they are less than half of what they were just several years ago. Of course, lower natural gas prices benefit the consuming sectors.

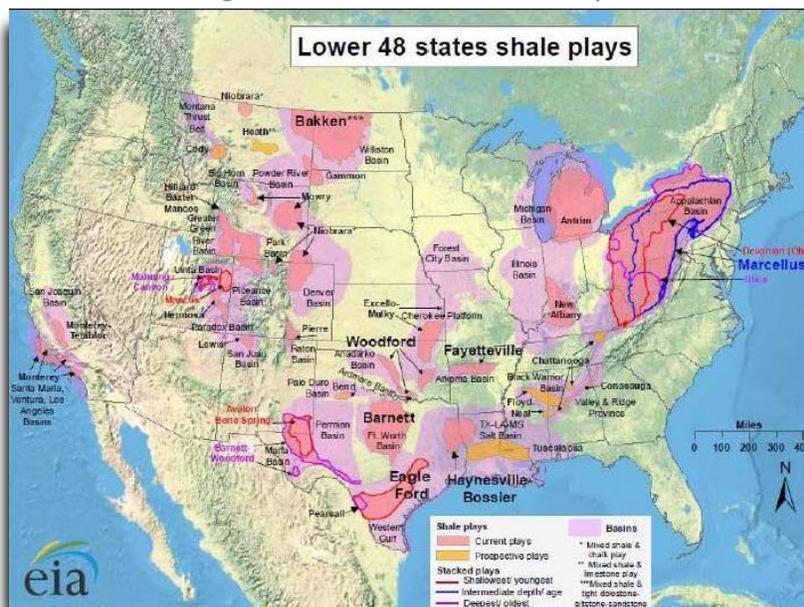
**RTO Firm Fuel Requirements?**

Not only is the natural gas supply industry talking about deliverability of the commodity, but so is the power consuming side of the commodity, including FERC and the RTOs/ISOs. In its November 20, 2014 Order, the FERC directed each RTO/ISO to file a report on the status of its efforts to address market and system performance associated with fuel assurance issues.

**According to MISO's report to the FERC, fuel availability issues can affect all generating units in the MISO footprint, potentially impacting their ability to perform and deliver energy.** Although MISO states that fuel assurance is an important consideration in resource adequacy and energy market operations, and a critical factor in MISO's ability to reliably meet customer's electricity needs under a wide range of operating conditions, MISO believes load serving entities, with oversight by the States as applicable by jurisdiction, are primarily responsible for ensuring resource adequacy. A fuel survey conducted by MISO shows that of the 53,000 MW of generators that responded, only about 15% of them had firm natural gas pipeline deliverability arrangements.

According to PJM's report, the most significant initiative to improve fuel assurance in the PJM region is PJM's capacity performance plan which has just recently been approved by the FERC. Under this arrangement, owners and operators of generation capacity resources would have strong economic incentives to invest in fuel assurance, including firm fuel transportation arrangements. PJM will make capacity market offer caps more flexible so as to allow fuel assurance costs to be included in sell offers. The would pair the additional flexibility to include costs associated with such investments with more severe economic

Figure 2. Lower 48 States Shale Plays



EIA May 2014 "Lower 48 States Shale Plays" Map

continued on page 3



consequences for resource non-performance, including lack of firm fuel arrangements. PJM believes the combination of increased offer flexibility and significant consequences for non-performance will encourage sellers to invest in firm fuel arrangements.

### Pipeline Commitments

Outside of electric utilities, other gas consuming sectors are beyond being encouraged; they've made firm commercial commitments as was confirmed by Kinder during his keynote talk when he said investors, such as petrochemical industrial customers in Texas and Louisiana, have moved to lock in deliverability rights. These deliverability arrangements are year round, firm base load deliveries and gas producers are now looking to do the same. In the past, the natural gas distribution sector would sell its year round contracted capacity during non-winter months, mainly to the power generation sector, but new pipeline capacity will not be released. Like the turnaround in the direction of pipeline flows, this non-released capacity will also be a turnaround from the norm and adds to the deliverability discontinuity dilemma.

### Conclusion

In light of all of these conflicting trends, natural gas consumers need to do their due diligence on the expected reliability of their natural gas deliverability and address any potential unfavorable discontinuities. This starts with supply contracting and ends with delivery point transport. Work to be done includes:

1. Evaluating firmness of supply arrangements, the liquidity of supply points, and assessing potential price basis exposure;

*"According to MISO's report to the FERC, fuel availability issues can affect all generating units in the MISO footprint, potentially impacting their ability to perform and deliver energy."*

2. Evaluating the subscription level of the delivering pipeline in addition to evaluating the pipeline's balancing arrangement and associated imbalance costs;
3. Assessing gas requirements on an hourly/daily/monthly basis, managing daily gas swings, and optimizing gas arrangements and capabilities; and,
4. If necessary, developing appropriate meter point allocations for the end gas users.

Natural gas consumers should proactively plan and be prepared to conduct commercial transactions for supply and transportation and potentially, develop unique, custom solutions. GDS recently assisted a client with implementing a custom solution, which was to arrange pipeline deliverability through a single meter for multiple power generating units (at the same plant site) that were dispatched separately by different owners who have separate supply and transport arrangements. Reliable natural gas arrangements extends beyond just the physical natural gas commodity and includes energy management sourcing and contracting, price hedging, and risk management. ■

For more information or to comment on this article, contact:

**Paul Wielgus**, Managing Director  
GDS Associates, Inc. - Marietta, GA  
770.425.8100 or  
[paul.wielgus@gdsassociates.com](mailto:paul.wielgus@gdsassociates.com)

