

***CURRICULUM VITAE***  
**DES EXPERTS DE GAZ MÉTRO**

**EXPERTS**

**EN RÉFÉRENCE À LA PIÈCE**

Jake Abes, Det Norske Veritas (Canada) Ltd.

Gaz Métro-1, Document 8

Daniel Denis, SECOR-KPMG

Gaz Métro-1, Document 6

Jeff D. Makholm, National Economic Research Associates, Inc.

Gaz Métro-1, Document 9

Arnaud Renaud, Artelys

Gaz Métro-1, Document 7

Guillaume Tarel, Artelys

Gaz Métro-1, Document 7



# Jake Abes, P. Eng.

President, Det Norske Veritas (Canada) Ltd.



MANAGING RISK

## Curriculum Vitae

---

### Summary of Professional Experience

Mr. Abes is President and Country Manager for Det Norske Veritas (Canada) Ltd. He has over thirty years of experience in the oil and gas pipeline industry, specializing in the areas of pipeline safety, regulatory compliance and safety management systems.

Mr. Abes worked at the National Energy Board of Canada for sixteen years, during which time his responsibilities included the development of standards and regulations, compliance monitoring and enforcement and accident investigations. He was part of the project team for the NEB Public Inquiry into Stress Corrosion Cracking on Pipelines, and was the project manager responsible for the implementation of the recommendations arising from the Inquiry.

In 1999, Mr. Abes entered private practice, providing a broad spectrum of services to the pipeline industry including the development and implementation of programs for regulatory compliance, quality management, integrity management, safety, emergency response and incident investigations, as well as integrated management systems.

Before joining DNV in 2005, Mr. Abes served as Vice President of Technology & Operations at the Canadian Energy Pipeline Association, where he was responsible for promoting and facilitating improved industry performance in the areas of public safety, pipeline integrity and environmental stewardship; representing the interests of the pipeline industry before governments, regulators and other stakeholders; and facilitating the resolution of operational and regulatory issues affecting the pipeline industry.

Since 2000, Mr. Abes has been a member of the Organizing Committee for the International Pipeline Conference (IPC), which has developed into the premier conference on pipeline technology. He Chaired the Committee from 2001 to 2006.

Since 1983, he has chaired and been a member of numerous CSA (Canadian Standards Association) Committees for the development of the national pipeline code for Canada (CSA Z662 Oil and Gas Pipeline Systems). He is currently the Chair of the CSA Technical Subcommittee on Management Systems.

In 2003, Mr. Abes received the CSA Award of Merit for his commitment, expertise and leadership in the development and advancement of standards for the oil and gas pipeline industry.

### Education

M. Eng. (1988), Carleton University, Ottawa, Ontario

B. Eng., Civil Engineering, (1979), Carleton University, Ottawa, Ontario

# Jake Abes, P. Eng.

President, Det Norske Veritas (Canada) Ltd.



## Curriculum Vitae

MANAGING RISK

### Experience

President/Country Manager	Det Norske Veritas (Canada) Ltd.	Present
Senior Vice President Canadian Operations	CC Technologies Canada, Ltd. (A DNV Company) Calgary, Alberta	2005-2008
Vice President Technology & Operations	Canadian Energy Pipeline Assoc. Calgary, Alberta	2001–2005
President	Pipeline Safety Consulting Inc. Calgary, Alberta	1999-2001
Manager Regulatory Affairs	Greenpipe Industries Ltd. Calgary, Alberta	1998-1999
Manager Accident Investigation Div.	National Energy Board Calgary, Alberta	1994-1998
Chief Safety Division	National Energy Board Calgary, Alberta	1991-1994
Coordinator Standards & Regulations	National Energy Board Ottawa, Ontario	1986-1990
Pipeline Engineer	National Energy Board Ottawa, Ontario	1982-1986

### Professional Organizations

Association of Professional Engineers, Geologists and Geophysicists of Alberta

American Society of Mechanical Engineers

Canadian Standards Association

National Association of Corrosion Engineers

### Professional Activities

American Society of Mechanical Engineers

- International Pipeline Conference Organizing Committee – since 2000
- International Pipeline Conference Technical Committee – since 2000

Banff Pipeline Integrity Workshop

- Organizing Committee 2000-2005

# Jake Abes, P. Eng.

President, Det Norske Veritas (Canada) Ltd.



## Curriculum Vitae

---

MANAGING RISK

### Canadian Petroleum Safety Council

- Board of Directors, 2003-2004

### Canadian Standards Association

- Strategic Steering Committee for Petroleum and Natural Gas Industry Systems
- Z662 Technical Committee for Oil and Gas Pipeline Systems – Past Chair
- Task Force on Land Use Planning Guidelines for Pipelines
- Subcommittee on Management Systems - Chair
- Subcommittee on Design – Past Chair
- Subcommittee on Operations and Systems Integrity
- Subcommittee on Construction
- Subcommittee on Materials

### Petroleum Industry Annual Safety Seminar

- Organizing Committee, 2001-2004

### Petroleum Industry Training Service

- Board of Directors, 2003-2004

### University of Calgary

- Pipeline Engineering Center - Industry Advisory Committee

## Publications

Zhou, J., Murray, A., Abes, J., “Implementation of Alternative Integrity Validation on a Large Diameter Pipeline Construction Project”, Proceedings of the 2008 International Pipeline Conference, Paper No. IPC2008-64479, Calgary, Alberta, Canada, October 2008.

Abes, J., “Safety and Loss Management System for Pipelines”, Journal of Pressure Vessel Technology, Paper No. PVT-07-1009, Vol. 130, May 2008.

Abes, J., “Safety and Loss Management System for Pipelines”, Proceedings of the 2006 International Pipeline Conference, Paper No. IPC2006-10106, Calgary, Alberta, Canada, September 2006.

Eiber, B., Hopkins, P., McLamb, M., Abes, J., “Operation of New Design and/or Conversion of Existing Gas Pipelines to 80 Percent SMYS Operating Stress” Gas Research Institute Report No. GRI-04/0152, November 2004.

Cetiner, M., Singh, P., Abes, J., Gilroy-Scott, A., “UV Degradation of Fusion Bonded Epoxy Coating in Stockpiled Pipes”, Proceedings of the 2000 International Pipeline Conference, Vol. 2, p. 691, Calgary, Alberta, Canada, October 2000.

Abes, J., “NEB Inquiry into Stress Corrosion Cracking on Pipelines: Emergency Response Issues”, Emergency Response and Critical Infrastructure Protection in the Gas & Electric Industries, Institute of Gas Technology, Arlington, Virginia, U.S.A., June 1997.

# Jake Abes, P. Eng.

President, Det Norske Veritas (Canada) Ltd.



## Curriculum Vitae

---

Abes, J., "NEB Public Inquiry into Stress Corrosion Cracking", 1997 NACE Canadian Region Western Conference, Edmonton, Alberta, Canada, February 1997.

Priddle, R. and Abes, J., "Management of Pipeline Safety by the National Energy Board of Canada"; Proceedings of the Fourteenth World Petroleum Congress, Vol. 3, p. 539, Stavanger, Norway, 1994.

Abes, J., Salinas, J., and Rogers J.T., "Risk Assessment Methodology for Pipeline Systems", Structural Safety, Vol. 2, p. 225-237, 1985.

Abes, J.; Salinas, J.; and Rogers, J.T., "Relative Risk Between Two Gas Pipeline Systems", Symposium on Risk in Transport, Institute for Risk Research, University of Waterloo, December 1983.

## Presentations

"Safety Management Systems", International Pipeline Security Forum, Ottawa, Ontario, Canada, October 30-31, 2013

"Safety Management Systems", CEPA Integrity First Symposium, Toronto, Ontario, Canada, April 25, 2013

"Management of Change", Banff 2013 Pipeline Workshop, Banff, Alberta, Canada, April 8-11, 2013

"Overview of Risk-Based Requirements in CSA Z662", Banff 2013 Pipeline Workshop, Banff, Alberta, Canada, April 8-11, 2013

"Safety Management Systems for Pipelines", NACE Pipeline Integrity Management Seminar, Calgary, Alberta, Canada, June 24-25, 2009.

"A Management Systems Approach to Pipeline Integrity", Second Canada-India Workshop on Pipeline Integrity, Calgary, Alberta, Canada, September 25-26, 2008.

"Safety and Loss Management Systems for Pipelines", Banff 2007 Pipeline Workshop: Managing Pipeline Integrity, Banff, Alberta, Canada, April 1-5 2007

"CSA Code Directions: Pipeline Management Systems", CGA Eastern Operations Workshop, Canadian Gas Association, Ottawa, Ontario, Canada, March 5-6, 2007

"Safety and Loss Management Systems for Pipelines", CSA Biennial Forum, Canadian Standards Association, Calgary, Alberta, Canada, November 2005

"Security in the Canadian Pipeline Industry", 2005 PGAC Transposium, Propane Gas Association of Canada, Calgary, Alberta, Canada, September 2005

"Bridging the Gap: Labour Demand and Supply", 5<sup>th</sup> Arctic Gas Symposium, Canadian Institute, Calgary, Alberta, Canada, March 2005

# Jake Abes, P. Eng.

President, Det Norske Veritas (Canada) Ltd.



MANAGING RISK

## Curriculum Vitae

---

“Land Use Planning for Pipelines”, Public Awareness Workshop, National Energy Board, Montreal, Canada, September 2004

“Technological Demands and Capacity Building for the Canadian Pipeline Industry”, Rio Pipeline Conference, Instituto Brasileiro de Petroleo e Gas, Rio de Janeiro, Brazil, October 2003

“Development of CSA Z662-03, CSA Biennial Forum, Canadian Standards Association, Calgary, Alberta, Canada, November 2003

“CSA Z662-2003 Oil and Gas Pipeline Systems” Tutorial, 2003 Banff Pipeline Workshop, Managing Pipeline Integrity, Banff, Alberta, Canada, April 2003

“A Systems Approach to Operational Excellence”, PGAC Transposium, Propane Gas Association of Canada, Calgary, Alberta, Canada, September 2002

“Managing Pipeline Integrity”, Pipeline Integrity Management Seminar, National Association of Corrosion Engineers, Calgary, Alberta, Canada, May 2002

“Emergency Response for Pipelines”, First Nations Emergency Preparedness and Disaster Response Workshop, Edmonton, Alberta, Canada, January 2001





# Daniel Denis

## Associé



### Daniel Denis

Associé

SECOR-KPMG  
600, De Maisonneuve Ouest, 1500  
Montreal, Quebec  
Canada, H3A 03A

Tel +1 (514) 985-1285  
Cell +1 (514) 953-7355  
[danieldenis@kpmg.ca](mailto:danieldenis@kpmg.ca)

### Fonction et spécialisation

Daniel est responsable de la pratique canadienne économie et de la pratique québécoise des Ressources naturelles. Il est aussi membre de la pratique Stratégie & Opération de Services Conseil. Il est spécialisé en analyse stratégique et économique.

### Education et diplôme

- Maîtrise en Science économique de l'Université de Montréal
- Bachelier du département de Science économique de l'Université de Montreal

### PROFIL GÉNÉRAL

Daniel Denis possède plus de 30 années d'expérience en conseil. Depuis 1989, il est associé de SECOR (maintenant intégré à KPMG) et le responsable des mandats réalisés en analyse économique, de même que dans les ressources naturelles. Monsieur Denis a effectué et dirigé plusieurs études sur l'organisation industrielle, le développement économique, la réglementation, le financement et les finances publiques. Au fil des ans, il a été impliqué dans une multitude de dossiers portant sur l'élaboration des enjeux stratégiques de plusieurs entreprises de diverses tailles, de même que dans la mise en place des stratégies d'actions pour y répondre. Daniel Denis est fréquemment appelé à agir à titre d'expert-conseil par diverses instances gouvernementales, associations et médias dans l'analyse de divers dossiers à caractère économique ou industriel.

### PRINCIPAUX CHAMPS DE COMPÉTENCE

- Planification stratégique
- Diagnostic et plan d'action
- Analyse économique et financière
- Processus d'affaires

### EXPÉRIENCE PROFESSIONNELLE ET SECTORIELLE EN ÉNERGIE

#### Secteur gazier et pétrolier (*quelques exemples*)

- Estimation de la demande potentielle de gaz naturel au Québec sur l'horizon 2030
- Évaluation des impacts économiques associés à la réalisation d'un port méthanier pour réception de gaz naturel liquide
- Évaluation des impacts économiques des projets canadiens d'exploration et d'extraction de pétrole
- Présentation de la chaîne de création de valeur du secteur pétrolier canadien
- Perspectives de développement moyen terme du marché gazier au Québec
- Évaluation des impacts économiques liés au développement des gaz de schiste
- Évaluation des impacts économiques associés à la reconfiguration du réseau de transport de gaz par pipeline
- Plan d'action stratégique d'un grand distributeur gazier
- Évaluation du potentiel de desserte de la Côte-nord en gaz naturel par pipeline
- Évaluation des impacts économiques associés à différents scénarios de transport du gaz provenant du projet Isle de Sable

### EXPÉRIENCE PROFESSIONNELLE ET SECTORIELLE EN ÉNERGIE (suite)

#### Secteur électrique (quelques exemples)

- Analyse du potentiel de développement industriel d'une politique de rabais tarifaire
- Développement d'un modèle nationale de prévision de demande électrique
- Validation des prévisions nationales de demande d'énergie électrique
- Analyse économique des diverses filières de production d'énergie électriques
- Analyse du potentiel technico-économique en matière d'efficacité énergétique
- Revue du processus de planification d'une entreprise énergétique
- Stratégie de commercialisation d'une gamme étendue de services énergétiques
- Évaluation d'une importante initiative d'efficacité énergétique dans le secteur industriel
- Élaboration des plans d'efficacité énergétique des marchés résidentiel, commercial et industriel
- Revue des programmes d'efficacité énergétique des entreprises de distribution nord-américaine d'électricité
- Évaluation de la pertinence d'introduire une tarification marginale

#### Secteur des énergies renouvelable (quelques exemples)

- Analyse économique de projets d'éoliennes
- Portrait du marché et des principaux acteurs du secteur éolien
- Évaluation d'un projet de cogénération à la biomasse

### EXPÉRIENCE PROFESSIONNELLE EN DÉPÔT D'AVIS D'EXPERT ET TÉMOIGNAGE

#### Avis et témoignage (quelques exemples)

- Régie de l'énergie : Études sur la demande de gaz naturel au Québec sur l'horizon 2030 (rapport d'expert indépendant demandé par la Régie)
- BAPE : Quatre études économiques déposées et deux témoignages
- Tribunal administratif des Transports : Trois études économiques déposées et deux témoignages (reconnu comme expert économique dans les témoignages)
- Tribunal canadien de la concurrence : Huit études économiques déposées
- Tribunal administratif de l'accès à l'information : Une étude économique déposée
- Office national de l'Énergie : Une étude économique déposée
- Arbitrage de rémunération : Six études économiques déposées et six témoignages (reconnu comme expert économique dans les témoignages)

### PUBLICATIONS ET CONFÉRENCES

#### Publications

- « Pour une nouvelle politique budgétaire québécoise », Institut C.D. Howe (Montréal), 1985, 52 pages.
- « L'évolution démographique du marché du travail et le rôle des prix », dans Le Marché du travail au Québec, Institut C.D. Howe (Montréal), 1985, p. 5-26.
- « La rémunération des employés des secteurs public et parapublic », dans Le redressement des finances publiques québécoises, Institut C.D. Howe (Montréal), 1986, p. 25-45.
- « Les impacts du libre-échange sur l'emploi : une perspective plus juste », dans Rapport d'un colloque sur le libre-échange, cahiers de l'ACFAS, n.51, p. 244-29.
- « Les revenus des municipalités québécoises », dans Rapport de la Commission québécoise d'étude sur les municipalités, 1986
- « Les dépenses des municipalités québécoises », dans Rapport de la Commission québécoise d'étude sur les municipalités, 1986
- « How to Build a Pharmaceutical Industry : Quebec's Story » avec David Griller, 2008, 73 pages.

#### Conférences

- « Modèle d'affaire 2.0 de la recherche pharmaceutique », Présentation à la Faculté de pharmacie de l'Université de Montréal, 26 février 2015.
- « Modèle d'affaire 2.0 de la recherche pharmaceutique », Présentation de la cadre de l'événement Rx&D/IOG, 27 novembre 2014.
- « Gestion de projets miniers pour non minier », Présentation dans le cadre de la Conférence Objectif Nord, 1er octobre 2014.
- « Nos infrastructures : Une vision globale pour un meilleur rapport qualité-prix » Présentation aux Assises annuelles de l'Union des municipalités du Québec, 22 mai 2014.
- « L'internationalisation des entreprises québécoises », Présentation au Colloque annuel de l'ASDEQ, Mai 2014.
- « Impact économique de l'accord de Libre-échange avec l'Europe », Présentation dans le cadre d'un colloque organisé par Fasken-Martineau, 26 novembre 2013.
- « Revue des grandes tendances macroéconomiques pour le secteur de l'assurance au Québec en 2013 », Présentation dans le cadre d'un colloque sur le secteur de l'assurance, 16 mai 2013.
- « Étude sur la gestion des projets d'infrastructure québécois et extension aux projets municipaux », Présentation aux Assises annuelles de l'Union des municipalités du Québec, 10 mai 2013.
- « Valeur économique et évolution récente du secteur des sciences de la vie et technologies de la santé », Cocktails des grands dirigeants de Montréal InVivo, 5 décembre 2012.

### PUBLICATIONS ET CONFÉRENCES (suite)

#### Conférences (suite)

- « L'importance relative des investissements en immobilisations », Assemblée annuelle de Montréal International, Montréal, 18 octobre 2012.
- « Rendre l'entreprise plus innovante afin de conjuguer innovation et création de richesse », Congrès annuel de l'Association des économistes du Québec, Montréal, 3 mai 2012.
- « La place du Québec sur la planète aluminium », Chambre de commerce et d'industrie de Chicoutimi, Chicoutimi, 27 février 2012.
- « La situation économique 2012 », Déjeuner causerie de la Jeune Chambre de commerce de Montréal, Montréal, février 2012.
- « Les répercussions économiques des activités minières », Forum sur le développement minier en Abitibi-Témiscamingue, Val d'Or, 9 avril 2011.
- « Optimisation de la gestion et de la prévention de la chronicité », Colloque du Conseil du patronat du Québec, Montréal, 24 novembre 2010.
- « Le Corridor St-Laurent : un atout économique de premier plan pour le Québec et le Canada », Déjeuner causerie de la Société de développement du St-Laurent, Montréal, 12 novembre 2010.
- « La Commission unique des valeurs mobilières et ses répercussions économiques pour le Québec », Ordre des comptables du Québec, Montréal, 28 septembre 2010.
- « Étude comparative des coûts de construction au Québec », Congrès annuel de l'Association de la construction du Québec, Québec, septembre 2010.
- « Le secteur biopharmaceutique : Un important levier de création de richesse économique », Forum stratégique de la Chambre de commerce du Montréal métropolitain, Montréal, 16 avril 2010.
- « La revue du financement 2010 en capital de risque au Québec », Congrès annuel de Réseau Capital, Montréal, 17 février 2010.
- « Économie : Un retour à la normale ? », Présentation dans le cadre de l'évènement SPECTRE des HEC, Montréal, 4 décembre 2009.
- « Public-Private Partnerships to Support Drug Discoveries », EuroBio, Lille, 25 septembre 2009.
- « Perspectives 2009 : Crise ou reprise », Déjeuner causerie Ferrera, Montréal, 3 février 2009.
- « Sept ans plus tard... avec un regard restant tourné sur l'avenir », Congrès annuel de l'Association de la construction du Québec, Rimouski, septembre 2007.
- « Consolidation et masse critique : Le secteur des TIC est-il à l'abri de cette évolution », Présentation dans le cadre de Vision PDG de InterLogiq, Montréal, 22 février 2007
- « Les répercussions du nouveau contexte d'affaires sur l'innovation thérapeutique », Rencontre annuelle du Pole Innovation Thérapeutique, Strasbourg, 19 décembre 2006.

**JEFF D. MAKHOLM**  
**Senior Vice President**

National Economic Research Associates, Inc.  
200 Clarendon Street  
Boston, Massachusetts 02116  
(617) 927-4540

Dr. Makhholm concentrates on the issues surrounding the privatization, regulation and deregulation of energy and transportation industries—those that operate networks (such as oil and gas pipelines, electricity transmission and gas distribution systems, telecommunications and water utility systems) and those operating infrastructure business at specific sites, such as oil refineries, electricity generation plants, gas treatment plants, sewage treatment plants and airports. These issues include the broad categories of efficient pricing, market definition and the components of reasonable regulatory practices. Specific pricing issues include tariff design, incentive ratemaking, and the unbundling of prices and services, and analysis of energy commodities markets. Issues of market definition include assessments of mergers, including the identification and measurement of market power. Issues of reasonable regulatory practices include the creation of credible and sustainable accounting rules for ratemaking as well as the establishment of administrative procedures for regulatory rulemaking and adjudication. On such issues among others, Dr. Makhholm has prepared expert testimony, reports and statements, and has appeared as an expert witness in many states, federal and U.S. district court proceedings as well as before regulatory bodies and Parliamentary panels abroad.

Dr. Makhholm's clients in the United States include privately held oil, gas and utility corporations, public corporations and government agencies. He has represented dozens of gas and electric distribution utilities, as well as both intrastate and interstate oil and gas pipeline companies and oil, gas and electricity producers. Dr. Makhholm has also worked with many leading law firms engaged in issues pertaining to the local and interstate regulation of energy utilities.

Internationally, Dr. Makhholm has directed an extensive number of projects in the utility and transportation businesses in 20 countries on six continents. These projects have involved work for investor-owned and regulated business as well as for governments and the World Bank. These projects have included advance pricing and regulatory work prior to major gas, railroad and toll highway privatizations (Poland, Argentina, Bolivia, Mexico, Chile and Australia), gas industry restructuring and/or pricing studies (Canada, China, Spain, Morocco, Mexico and the United Kingdom), utility mergers and market power analyses (New Zealand), gas development and and/or contract and financing studies (Tanzania, Egypt, Israel and Peru), regulatory studies (Chile, Argentina), and oil pipeline transport financing and regulation (Russia). As part of this work, Dr. Makhholm has prepared reports, drafted regulations and conducted training sessions for many government, industry and regulatory personnel.

Dr. Makhholm has published a number of articles in various peer-reviewed and editor-reviewed publications (*Public Utilities Fortnightly*, *Natural Gas*, *The Electricity Journal*, *The Energy Law Journal*, *Competition and Regulation in Network Industries*, and *Economics of Energy & Environmental Policy*)—many involving emerging issues of wholesale and retail competition in gas and electricity, including the issues of unbundled and competitive transport, secondary markets and stranded costs. He is a frequent speaker in the U.S., Europe and elsewhere at conferences and seminars addressing market, pricing and regulatory issues for the energy and transportation sectors. His book, *The Political Economy of Pipelines: A Century of Comparative Institutional Development*, published by the University of Chicago Press, was published in 2012.

**EDUCATION**

UNIVERSITY OF WISCONSIN-MADISON,  
MADISON, WISCONSIN  
Ph.D., Economics, 1986  
Dissertation: Sources of Total Factor Productivity in the Electric Utility Industry  
M.A., Economics, 1985

BROWN UNIVERSITY  
PROVIDENCE, RHODE ISLAND  
Graduate Study, 1980-1981

UNIVERSITY OF WISCONSIN-MILWAUKEE  
MILWAUKEE, WISCONSIN  
M.A., Economics, 1980  
B.A., Economics, 1978

**EMPLOYMENT**

1996-present	<u>Senior Vice President.</u> National Economic Research Associates, Inc., (NERA) Boston, Massachusetts.
1986-1996	<u>Vice President/Senior Consultant.</u> National Economic Research Associates, Inc., (NERA) Boston, Massachusetts.
1987-1989	<u>Adjunct Professor.</u> College of Business Administration, Northeastern University, Boston, Massachusetts
1984-1986	<u>Consulting Economist.</u> National Economic Research Associates, Inc., (NERA) Madison, Wisconsin.
1983-1984	<u>Consulting Economist.</u> Madison Consulting Group, Madison, Wisconsin.
1981-1983	<u>Staff Economist.</u> Associated Utility Services, Inc., Moorestown, New Jersey.

**RECENT TESTIMONY (SINCE 2000)**

Before the National Energy Board, Expert Report and Direct Testimony on behalf of MAS (Market Area Shippers Group), Hearing Order RH-001-2014, July 2014. Subject: Effectiveness of toll design//regime in settlement.

Before the National Energy Board, Expert Testimony on behalf of FortisBC Energy Inc., Hearing Order Number GH-001-2014, July 10, 2014. Subject: Tolling for pipeline extensions.

Before the National Energy Board, Expert Testimony on behalf of Alliance Pipeline, May 22, 2014. Subject: Restructuring services/tolls.

Before the 298<sup>th</sup> Judicial District Court of Dallas County, Texas, Expert Testimony on behalf of plaintiff in Energy Transfer Partners, L.P., and Energy Transfer Fuel, L.P. v. Enterprise Products Partners, L.P., Enbridge (US) Inc., and Enterprise Products Operating LLC, Cause No. 11-12667, February 2014. Subject: Assessment of causation and valuation of damages from lost pipeline opportunity.

Before the National Energy Board, Expert Testimony on behalf of Enbridge Gas Distribution Inc. and Union Gas limited, Hearing Order MH-001-2013, November 1, 2013. Subject: Tolling issues involving pipeline abandonment.

Before the National Energy Board, Expert Report and Direct Evidence on behalf of MAS (Market Area Shippers Group), Hearing Order RH-001-2013, July 26, 2013. Subject: Contract renewal provisions.

Before the 298<sup>th</sup> Judicial District Court of Dallas County, Texas, Supplemental Report on behalf of plaintiff in Energy Transfer Partners, L.P., and Energy Transfer Fuel, L.P. v. Enterprise Products Partners, L.P., Enbridge (US) Inc., and Enterprise Products Operating LLC, Cause No. 11-12667, July 24, 2013. Subject: Causation and damages in abandoned joint oil-pipeline venture

Before the 298<sup>th</sup> Judicial District Court of Dallas County, Texas, Rebuttal Expert Report on behalf of plaintiff in Energy Transfer Partners, L.P., and Energy Transfer Fuel, L.P. v. Enterprise Products Partners, L.P., Enbridge (US) Inc., and Enterprise Products Operating LLC, Cause No. 11-12667, March 2013. Subject: Causation and damages in abandoned joint oil-pipeline venture

Before the 298<sup>th</sup> Judicial District Court of Dallas County, Texas, Direct Expert Report on behalf of plaintiff in Energy Transfer Partners, L.P., and Energy Transfer Fuel, L.P. v. Enterprise Products Partners, L.P., Enbridge (US) Inc., and Enterprise Products Operating LLC, Cause No. 11-12667, January 2013. Subject: Causation and damages in abandoned joint oil-pipeline venture

Before the Alberta Public Utility Commission, Direct Testimony on behalf of ATCO Electric and ATCO Gas, Proceeding ID #2131, December 2012. Subject: Analysis of ATCO Electric's and ATCO Gas' capital tracker proposals

Before the American Arbitration Association, Expert Report with Dr. Victor P. Goldberg, Case No. AAA No. 16 132 Y 00502 11. December 17, 2012. Subject: Confidential Arbitration.

Before the National Energy Board, Written Evidence on behalf of FortisBC Energy Inc., Hearing Order GH-001-2012, May 29, 2012. Subject: Tariff treatment for pipeline extensions to new Canadian gas production regions.

**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the National Energy Board, Expert Report and Direct Testimony on behalf of Market Area Shippers Group, Hearing Order RH-003-2011, March 2012. Subject: Assessment of TransCanada's omnibus restructuring proposal and commentary on Market Area Shippers Group's alternative solution.

Before the Alberta Public Utility Commission (with Agustin J. Ros). Reply Expert Report. Application No. 1606029, AUC Proceeding 566. February 22, 2012. Subject: Update to TFP analysis and review of PBR plans for the Commission's performance-based regulation initiative.

Before the State Corporation Commission of the State of Kansas, Testimony on Behalf of Coffeyville Resources Refining & Marketing, LLC, Docket No. 12-MDAP-068-RTS. October 25, 2011. Subject: Reasonable ratemaking methodology.

Before the United States Federal Energy Regulatory Commission, Prepared Direct Testimony in Public Utilities Commission of Nevada and Sierra Pacific Power Company v Tuscarora Gas Transmission Company, Docket No. RP11-1823-000. October 17, 2011. Subject: Reasonable interstate gas pipeline tariff levels.

Before the Public Utilities Commission of Nevada, Pre-filed Rebuttal Testimony on behalf of Nevada Power Company and Sierra Pacific Power Company d/b/a NV Energy. Docket Nos. 11-03003, 11-03004 & 11-03005. August 3, 2011. Subject: Prudence of hedging practices.

Before the United States Federal Energy Regulatory Commission, Affidavit in Public Utilities Commission of Nevada and Sierra Pacific Power Company v Tuscarora Gas Transmission Company, Docket No. RP11-1823-000. February 28, 2011. Subject: Reasonable interstate gas pipeline tariff levels.

Before the Public Utilities Commission of Nevada, Prepared Direct on behalf of Nevada Power Company d/b/a NV Energy, 2011 Gas and Electric Deferred Energy Proceeding, Docket No. 11-03\_\_\_\_. February 24, 2011. Subject: Prudence of hedging practices.

Before the Public Utilities Commission of Nevada, Prepared Direct on behalf of Sierra Pacific Power Company d/b/a NV Energy, 2011 Gas Deferred Energy Proceeding, Docket No. 11-03\_\_\_\_. February 24, 2011. Subject: Prudence of gas hedging practices.

Before the Federal Energy Regulatory Commission and the State of Alaska Regulatory Commission, Prepared Direct Testimony on behalf of Trans Alaska Pipeline System. Docket No. IS09-348-004, *et al.* January 21, 2011. Subject: Prudence of capital rehabilitation costs.

Expert report filed before the Alberta Public Utility Commission (with Agustin J. Ros). Application No. 1606029, AUC Proceeding 566. December 30, 2010. Subject: Total factor productivity study for use in the Commission's performance-based regulation initiative.

Before the Commonwealth of Kentucky, Edmonson Circuit Court. Opinion on behalf of plaintiff in Honeycutt vs. Atmos Energy Corporation. Docket No. 09-CI-00198 and 10-CI-00040. September 10, 2010. Subject: Valuation of Natural Gas Commodity.

Before the Régie de l'Énergie, Direct Testimony on behalf of Hydro-Québec TransÉnergie. Demande R-3738-2010. August 2, 2010. Subject: Economic analysis of issues related to the regulatory policies for network upgrades.



**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the Public Utilities Commission of Nevada, Pre-Filed Supplemental Direct Testimony on behalf of Nevada Power Company, Sierra Pacific Power Company d/b/a NV Energy (electric and gas departments), Docket No: 10-03003, 10-03004, 10-03005. May 5, 2010. Subject: Gas hedging.

Before the Arkansas Public Service Commission, Rebuttal Testimony on behalf of Entergy Arkansas, Inc., Docket No. 09-084-U. March 24, 2010. Subject: Justification of the operation of a multi-year formula rate plan.

Before the Public Utilities Commission of Nevada, Pre-Filed Direct on behalf of Nevada Power Company, Docket No. 10-03003. February 26, 2010. Subject: Prudence of gas purchase costs.

Before the New York State Public Service Commission, Rebuttal Testimony on behalf of Rochester Gas and Electric Corporation, Case 09-E--07717 Case 09-G-0718 and New York State Electric & Gas Corporation, Case 09-E-0715, Case 09-E-0716. February 12, 2010. Subject: Cost of equity capital.

Before the Public Utilities Commission of Nevada, Pre-Filed Direct Testimony on behalf of Sierra Pacific Power Company , Docket No. 09-09001. December 15, 2009. Subject: Gas hedging plan.

Before the Public Utilities Commission of Nevada, Pre-Filed Direct Testimony on behalf of Nevada Power Company , Docket No. 09-07003. December 15, 2009. Subject: Gas hedging plan.

Before the New York State Public Service Commission, Direct Testimony on behalf of Rochester Gas and Electric Corporation, Case 09-E--07717 Case 09-G-0718. September 17, 2009. Subject: Cost of capital and capital structure.

Before the New York State Public Service Commission, Direct Testimony on behalf of New York State Electric & Gas Corporation, Case 09-E-0715, Case 09-E-0716. September 17, 2009. Subject: Cost of capital and capital structure.

Before the Arkansas Public Service Commission, Direct Testimony on behalf of Entergy Arkansas, Inc., Docket No. 09-084-U. September 4, 2009. Subject: Justification of the operation of a multi-year formula rate plan.

Submission before the New Zealand Commerce Commission, on behalf of Orion New Zealand Limited, July 31, 2009. Subject: Theory and practice of price cap regulation.

Before the Hawaii Public Utilities Commission, Testimony on behalf of Hawaiian Electric Company Inc., Docket No. 2008-0083. July 2009. Subject: Energy cost adjustment clause.

Before the Public Utilities Commission of Nevada, Pre-Filed Direct Testimony on behalf of Nevada Power Company , Docket No. 09-02 \_\_\_\_\_. February 27, 2009. Subject: Prudence of gas purchase costs.

Before the Public Utilities Commission of Nevada, Pre-Filed Direct Testimony on behalf of Sierra Pacific Power Company, Docket No. 09-02 \_\_\_\_\_. February 27, 2009. Subject: Prudence of gas purchase costs.

Before the Department of Public Utility Control of Connecticut, Direct Testimony on behalf of Connecticut Natural Gas Corporation. Docket No. 08-12-06. January 11, 2009. Subject: Cost of capital.

**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the Department of Public Utility Control of Connecticut, Direct Testimony on behalf of Southern Connecticut Gas Corporation. Docket No. 08-12-06. January 11, 2009. Subject: Cost of capital.

Before the Public Utility Commission of Texas, Rebuttal Testimony on behalf of Lone Star Transmission, LLC. Docket No. 35665. November 14, 2008. Subject: Licensing of new electricity transmission projects.

Before the Public Utilities Commission of Ohio, Direct Testimony on behalf of The Dayton Power and Light Company. Case No. 08-1094-EL-SSO. October 10, 2008. Subject: Cost of capital.

Before the Illinois Commerce Commission, Rebuttal Testimony on behalf of Northern Illinois Gas Company, Case No. 08-0363. September 25, 2008. Subject: Cost of capital.

Before the Illinois Commerce Commission, Testimony on behalf of Northern Illinois Gas Company, Case No. 08-0363. April 29, 2008. Subject: Cost of equity.

Before the Illinois Commerce Commission, Rebuttal Testimony on behalf of Shelby Coal Holdings, LLC, Christian Coal Holdings, LLC and Marion Coal Holdings, LLC. Docket No. 07-0446. April 7, 2008. Subject: Pipeline certification and competition in pipeline transport market.

Before the New York State Public Service Commission, Rebuttal Testimony on behalf of Iberdrola, S.A., Energy East Corporation, RGS Energy Group, Inc., Green Acquisition Capital, Inc., New York State Electric & Gas Corporation and Rochester Gas and Electric Corporation, Case No. 07-M-0906. January 31, 2008. Subject: Regulatory philosophy/ merger issues.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company, Docket No. 07-09016. January 14, 2008. Subject: Stand-alone costs and cost allocation issues.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company. Docket No. 07-09016. January 11, 2008. Subject: Allocation of pipeline transport costs.

Before the Illinois Commerce Commission, Testimony on behalf of Shelby Coal Holdings, LLC, Christian Coal Holdings, LLC and Marion Coal Holdings, LLC. Docket No. 07-0446. January 7, 2008. Subject: Pipeline certification and competition in pipeline transport market.

Before the Federal Energy Regulatory Commission, Affidavit on behalf of Consolidated Edison Company of New York, Docket No. OA08-13-000. January 7, 2008. Subject: Planning and allocation of electric transmission costs.

Before the Public Utilities Commission of Nevada, Direct Testimony on behalf of Sierra Pacific Power Company, Docket No. 07-09016. December 14, 2007. Subject: Stand-alone costs and cost allocation issues.

Before the New Hampshire Public Service Commission, Docket No. DE 07-064, invited appearance on an expert panel to present perspectives and answer questions on policies and practices regarding retail gas and electric distribution rate "decoupling," November 7, 2007.

Before the Public Utilities Commission of Nevada, Prefiled Direct Testimony on behalf of Sierra Pacific Power Company, Docket No. 07-05019. May 15, 2007. Subject: Prudence of gas purchase costs.

**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the United States Bankruptcy Court, Southern District of New York, Supplemental Report on behalf of Solutia, Inc., *et al.*, Debtors, Case No. 03-17949 (PCB) (Jointly Administered), April 20, 2007. Subject: Discount rate for contract rejection damages.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company, Docket No. 06-12001. April 19, 2007. Subject: Stand-alone costs and cost allocation issues.

Before the United States Bankruptcy Court, Southern District of New York, Supplemental Report on behalf of Solutia, Inc., *et al.*, Debtors, Case No. 03-17949 (PCB) (Jointly Administered), March 23, 2007. Subject: Discount rate for contract rejection damages.

Before the United States District Court, District of Kansas, Expert Report on behalf of J.P. Morgan Trust Company, *et al.* in the matter of J.P. Morgan Trust Company, *et al.* V. Mid-America Pipeline Company, *et al.*, Docket No. 05-CV-2231-CM/JPO. March 21, 2007. Title: "Harm to Farmland's Coffeyville Refinery Expert Report", by Jeff. D. Makhholm.

Before the Public Utilities Commission of Nevada, Prefiled Direct Testimony on behalf of Nevada Power Company, Docket No. 07-01022. January 16, 2007. Subject: Prudence of gas purchase costs.

Before the Public Utilities Commission of the State of Hawaii, Supplemental Testimony on behalf of Hawaii Electric Light Company, Inc., Docket No. 05-0135. December 29, 2006. Subject: Energy cost adjustment clause.

Before the Public Utilities Commission of the State of Hawaii, Testimony on behalf of Hawaiian Electric Company, Inc., Docket No. 2006-0386. December 22, 2006. Subject: Energy cost adjustment clause.

Before the Public Utilities Commission of Nevada, Pre-filed Direct Testimony on behalf of Sierra Pacific Power Company, Docket No. 06-12001. December 1, 2006. Subject: Stand-alone costs and cost allocation issues.

Before the State of New Jersey Board of Public Utilities, Prepared Reply Testimony on behalf of Public Service Electric & Gas, OAL Docket No. PUC1191-06 and BPU Docket No. EO05111005. November 3, 2006. Subject: Unregulated contract prices for telecommunication conduit rental contracts.

Before the State of New Jersey Board of Public Utilities, Rebuttal Testimony on behalf of the New Jersey American Water Company, Case No. WR06030257, October 10, 2006. Subject: Cost of Capital.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company, Docket No. 06-05016. October 2, 2006. Subject: Prudence of gas purchase costs.

Before the Federal Energy Regulatory Commission, Reply Testimony on behalf of the State of Alaska, Docket No. OR05-2-001, August 11, 2006. Subject: Relative risk and capital structure for the Trans Alaska Pipeline System (TAPS).

Before the Maine Public Utilities Commission, Response to the Bench Analysis on behalf of Central Maine Power Company, Docket 2005-729. May 19, 2006. Subject: Specification of productivity offset for price cap formula.

**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company, Docket No. 05-12001. May 17, 2006. Subject: Prudence of the company's gas hedging strategy.

Before the Public Utilities Commission of Nevada, Prefiled Direct Testimony on behalf of Sierra Pacific Power Company (Gas Division, WestPac Gas), Docket No. 06-0516. May 15, 2006. Subject: Prudence of the company's gas hedging strategy.

Before the State of New Jersey Board of Public Utilities, Testimony on behalf of the New Jersey American Water Company, Case No. WR06030257, March 29, 2006. Subject: Cost of Capital.

Before the Public Utilities Commission of Nevada, Direct Testimony on behalf of Nevada Power Company, Docket No.06-01016. January 17, 2006. Subject: Prudence of the company's gas hedging costs.

Before the New Brunswick Board of Commissioners of Public Utilities, Rebuttal Testimony on behalf of the Public Intervenor, Board Reference 2005-002. December 30, 2005 (original filing), January 23, 2006 (updated filing). Subject: Cost of capital.

Before the Public Utilities Commission of Nevada, Pre-Filed Direct Testimony on behalf of Sierra Pacific Power Company, Docket No.05-12001. December 1, 2005. Subject: Prudence of the company's gas hedging costs.

Before the Public Utilities Commission of Nevada, Pre-Filed Rebuttal Testimony on behalf of Sierra Pacific Power Company, Docket No.05-9016. December 2, 2005. Subject: Prudence of the company's energy supply plan.

Before the Public Utilities Commission of Nevada, Pre-Filed Rebuttal Testimony on behalf of Nevada Power Company, Docket No.05-9017. December 2, 2005. Subject: Prudence of the company's energy supply plan.

Before the Public Utilities Commission of Ohio, Supplemental Testimony on behalf of The Dayton Power and Light Company. Case No. 05-276-EL-AIR. September 26, 2005. Subject: Cost of capital.

Before the Illinois Commerce Commission, Surrebuttal Testimony on behalf of Northern Illinois Gas Company d/b/a Nicor Gas Company. Case No. 04-0779. May 12, 2005. Subject: Cost of capital.

Before the United States Bankruptcy Court, Northern District of Texas, Fort Worth Division, Reply Report on behalf of Mirant Corporation, et al, Debtors. Case No. 03-46590 (Jointly Administered). April 12, 2005. Subject: Pipeline capacity valuation.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company. Docket No 05-1028. April 12, 2005. Subject: Prudence of gas purchase costs.

Before the Illinois Commerce Commission, Rebuttal Testimony on behalf of Northern Illinois Gas Company d/b/a Nicor Gas Company. Case No. 04-0779. April 5, 2005. Subject: Cost of capital.

Before the United States Bankruptcy Court, Northern District of Texas, Fort Worth Division, Report on behalf of Mirant Corporation, et al, Debtors. Case No. 03-46590 (Jointly Administered). March 22, 2005. Subject: Pipeline capacity valuation.

**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the Public Utilities Commission of the State of Oregon, Direct Testimony and Exhibits on behalf of Portland General Electric. Docket No. UE-88 Remand. February 15, 2005. Subject: The cost consequences of abandoning the regulatory compact in Oregon on prudent invested capital.

Before the Public Utilities Commission of Nevada, Testimony and Exhibits on behalf of Sierra Pacific Power Company. Docket No 05-1028. January 5, 2005. Subject: Prudence of gas purchase costs.

Before the Public Utility commission of Oregon, Direct Testimony on behalf of Portland General Electric. Docket No. UE-165. November 17, 2004. Subject: Power supply risk related to PGE's hydroelectric generation sources.

Before the Public Utilities Commission of Nevada, Testimony on behalf of Nevada Power Company. Docket No. 04-11028. November 10, 2004. Subject: Examination of the prudence of gas purchase and hedging decision in the Company's 2004 deferral case.

Before the Illinois Commerce Commission, Testimony on behalf of Nicor Gas Company. Docket No. 04-0779. November 1, 2004. Subject: Cost of Capital.

Rebuttal Report for an ad-hoc arbitration on behalf of CITIBANK, N.A. in their case against NEW HAMPSHIRE INSURANCE COMPANY. Policy No. 576/ MF5113500. October 15, 2004. Subject: Claimants right to collect on a political risk insurance policy as a result of the expropriation of a toll-road concession's assets in Argentina.

Before the International Center for the Settlement of Investment Disputes, Testimony on behalf of Azurix Corp., in the case of Azurix Corp v. Government of Argentina in Paris, France, October 11th, 2004. Subject: Expropriation of a water utility concession in the province of Buenos Aires.

Before the Circuit Court of Fairfax, Virginia, Testimony on behalf of Upper Occoquan Sewage Authority in the case against Blake Construction Co., Inc., Poole and Kent, a Joint Venture. Case No. 206595. October 1, 2004. Subject: Valuation of capacity expansion project.

Expert Report for an ad-hoc arbitration on behalf of CITIBANK, N.A. in their case against NEW HAMPSHIRE INSURANCE COMPANY. Policy No. 576/ MF5113500. October 1, 2004. Subject: Claimants right to collect on a political risk insurance policy as a result of the expropriation of a toll-road concession's assets in Argentina.

Before the London Courts of International Arbitration, Rebuttal Report on behalf of CITIBANK, N.A. AND DRESDNER BANK AG in their case against AIG EUROPE (UK) LTD. AND SOVEREIGN RISK INSURANCE. Arbitration No. 3473. September 17, 2004. Subject: Claimants right to collect on a political risk insurance policy as a result of the expropriation of electric utility assets in Argentina.

Before the London Courts of International Arbitration, Expert Report on behalf of CITIBANK, N.A. AND DRESDNER BANK AG in their case against AIG EUROPE (UK) LTD. AND SOVEREIGN RISK INSURANCE. Arbitration No. 3473. August 6, 2004. Subject: Claimants right to collect on a political risk insurance policy as a result of the expropriation of electric utility assets in Argentina.

Before International Center for the Settlement of Investment Disputes, Rebuttal Report on behalf of Azurix Corp., in the case of Azurix Corp v. Government of Argentina, April 15th, 2004. Subject: Expropriation of a water utility concession in the province of Buenos Aires.

**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company. Case No: 03-12002. March 29, 2004. Subject: Rebutted argument that there was a link between the merger and the cost of electricity in the post-merger period.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Nevada Power Company. Case No: 03-10001 and 03-10002. February 5, 2004. Subject: Rebutted argument that there was a link between the merger and the cost of electricity in the post-merger period.

Before the New Zealand Commerce Commission, Testimony on behalf of Orion New Zealand. November 5, 2003. Subject: Productivity measures used in resetting the price path thresholds for electricity distributors in New Zealand.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company. Case No: 03-5021. September 2, 2003. Subject: Structure in place for governing and overseeing hedging/risk management process at Westpac Utilities, an operating division of Sierra Pacific Power Company.

Before the State of Maine Public Utilities Commission, Rebuttal Testimony on behalf of FairPoint New England Telephone Companies. July 11, 2003. Subject: Cost of capital.

Before the Public Utilities Commission of Nevada, Testimony on behalf of Sierra Pacific Power Company. Case No: 03-5021. May 14, 2003. Subject: Structure in place for governing and overseeing hedging/risk management process at Westpac Utilities, an operating division of Sierra Pacific Power Company.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Sierra Pacific Power Company. Case No: 03-1014. May 5, 2003. Subject: Prudence of gas procurement and hedging program.

Before the State of Maine Public Utilities Commission, Direct Testimony on behalf of FairPoint New England Telephone Companies. April 7, 2003. Subject: Cost of capital.

Before the Public Utilities Commission of Nevada, Rebuttal Testimony on behalf of Nevada Power Company. Case No: 02-11021. March 31, 2003. Subject: Prudence of gas procurement and hedging program.

Before Federal Communications Commission, Testimony on behalf of Iowa Telecommunications Services, Inc. Case No. March 25, 2003. Subject: Cost of capital.

Before Federal Energy Regulatory Commission, Testimony on behalf of PPL Wallingford Energy LLC. Case No: ERO3-421-000. January 9, 2003. Subject: Cost of equity.

Before the State of New Hampshire Public Utilities Commission, Rebuttal Testimony on behalf of Kearsarge Telephone Company. Case No. DT 01-221. December 20, 2002. Subject: Rebuttal on cost of equity.

Before the New York State Public Service Commission, Affidavit in support of Rochester Gas and Electric Corporation's Response to Staff's November 8, 2002 filing. Case No. 02-E-0198, 02-G-0199. November 14, 2002. Subject: Respond to staff's filing with respect to the rate-of-return and risk impacts of various regulatory mechanisms.

**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the Public Utility Commission of Texas, Rebuttal Testimony on behalf of American Electric Power Company, Inc., Mutual energy CPL, LP, Mutual Energy WTU, LP and Centrica PLC, Centrica N.S. Holding, Inc., Centrica Holdco, Inc.. Case No. 25957. October 28, 2002. Subject: Impact of the merger on competition in the retail electric market.

Before the International Center for the Settlement of Investment Disputes, Expert Testimony on behalf of Azurix Corp in the case of Azurix Corp v. Government of Argentina, October 15, 2002. Subject: Expropriation of a water utility concession in the province of Buenos Aires.

Before the State of New York Public Service Commission, Rebuttal Testimony on behalf of Rochester Gas and Electric Corporation. Case No. 02-E-0198, Case No. 02-G-0199. September 30, 2002. Subject: Cost of capital

Before the Connecticut Department of Public Utility Control, Update and Rebuttal Testimony on behalf of The United Illuminating Company, Case No. 01-10-10, April 4, 2002. Subject: Cost of capital.

Before the State of New York Public Service Commission, Direct Testimony on behalf of Rochester Gas and Electric Corporation. Case No. 02-E-0198, Case No. 02-G-0199. February 15, 2002. Subject: Cost of capital.

Before the Alberta Energy and Utilities Board, Update of Evidence on behalf of UtiliCorp Networks Canada, November 30, 2001. Subject: Testimony on the elements of the company's performance based regulation plan.

Before the Connecticut Department of Public Utility Control, Direct Testimony on behalf of The United Illuminating Company, Case No. 01-10-10, November 15, 2001. Subject: Cost of capital.

Before the Illinois Commerce Commission, Surrebuttal Testimony on behalf of Commonwealth Edison Company, Case No. 01-0423, October 24, 2001. Subject: Economic pricing for unbundled retail distribution services.

Before the Illinois Commerce Commission, Rebuttal Testimony on behalf of Commonwealth Edison Company, Case No. 01-0423, September 18, 2001. Subject: Economic pricing for unbundled retail distribution services.

Before the State of New York Public Service Commission, Prepared Rebuttal Testimony on behalf of New York State Electric & Gas Corporation. Case 01-E-0359. September 12, 2001. Subject: Electric price protection plan

Before the State of Maine Public Utilities Commission, Joint Rebuttal Testimony on behalf of Community Service Telephone Company. September 6, 2001 (with C. Zarkadas). Subject: Cost of equity capital.

Before the Public Service Commission of the State of Missouri, Rebuttal Testimony on behalf of Gateway Pipeline Company. Case GM-2001-595. August 20, 2001. Subject: Acquisition of Capital Stock of Utilicorp Pipeline Systems, and connection.

Before the State of New York Public Service Commission, Prepared Direct Testimony on behalf of New York State Electric & Gas Corporation. Case 01-E-0359. August 3, 2001. Subject: Electric price protection plan.

**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the Federal Energy Regulatory Commission, Prepared Answering Testimony on behalf of the Association of Oil Pipe Lines. Case No: OR96-2-000. June 21, 2001. Subject: Light-handed regulation of oil pipeline tariffs.

Before the Illinois Commerce Commission, Direct Testimony on behalf of Commonwealth Edison Company, Case No. 01-0423, June 1, 2001. Subject: Economic pricing for unbundled retail distribution services.

Before the Federal Energy Regulatory Commission, Affidavit on behalf of Florida Power & Light Co. May 31, 2001. Subject: Pricing of transmission services.

Before the Public Utility Commission of the State of Oregon, Rebuttal Testimony on behalf of Portland General Electric Company. May 21, 2001. Subject: Cost of capital.

Before the State of Maine Public Utilities Commission, Direct Testimony on behalf of Community Service Telephone Company. April 4, 2001 (with C. Zarkadas). Subject: Cost of equity capital.

Before the State of New Jersey Board of Public Utilities, Cross-Answering Testimony on behalf of Public Service Electric and Gas Company, Case No. GM00080564, March 26, 2001. Subject: Forecasting the net market value for natural gas transportation and storage contracts.

Before the Indiana Utility Regulatory Commission, Testimony on behalf of Tipton Telephone Company, Inc, February 23, 2001 (with C. Zarkadas). Subject: Cost of capital.

Before the Supreme Court of Victoria at Melbourne, in the matter of an appeal brought by TXU Electricity Limited of the Final Determination of the Office of the Regulator General of the 2001 to 2005 tariffs for the Victorian electricity distributors. Testimony on behalf the Office of the Regulator General, February 11, 2001. Subject: The distinctions between price cap and rate of return regulatory practices.

Before the Australian Competition Tribunal. Statement on behalf of the National Competition Council regarding the application under section 38(1) of the Gas Pipelines Access Law for review of the decision by the Minister for Industry, Science and Resources to Cover (i.e., regulate) the Eastern Gas Pipeline pursuant to the provisions of the National Third Party Access Code for Natural Gas Pipeline Systems and the Gas Pipelines Access Law, January 19, 2001. Subject: Evaluation of the criteria for regulating an interstate gas pipeline.

Before the Public Utility Commission of Texas. Rebuttal Testimony on behalf of American Electric Power Texas Companies (Central Power & Light Company, Southwest Electric Power Company, West Texas Utilities Company), Entergy Gulf States, Inc., Reliant Energy HL&P, Southwestern Public Service Company, Texas-New Mexico Power Company, and TXU Electric Company. October 27, 2000. Subject: Capital structure and allowed return on equity.

Before the Federal Energy Regulatory Commission, "Assessment of PJM Owner's Transmission Enhancement Package," prepared in support of the PJM (Pennsylvania, New Jersey, Maryland) electricity transmission owners as part of their Order No. 2000 compliance filing. Docket No. RT01-2, October 11, 2000. Subject: Analysis of incentive package for transmission efficiency.

Before the Appeal Panel under Section 38(2) of the Office of the Regulator-General Act 1994, Victoria, Australia. In the matter of an appeal pursuant to s.37 of the Act brought by United Energy Ltd., Testimony on behalf of the Office of the Regulator General, October 10, 2000. Subject: The distinctions between price cap and traditional cost-based regulatory practices.



**RECENT TESTIMONY (SINCE 2000 CONTINUED)**

Before the Alberta Energy and Utilities Board, Evidence on behalf of UtiliCorp Networks Canada, September 1, 2000. Subject: Testimony on the elements of the company's performance based regulation plan.

Before the State of Maine Public Utilities Commission, Surrebuttal Testimony on behalf of Central Maine Power Company, Case No. 99-666, August 10, 2000. Subject: Empirical analysis and productivity offset for price cap formula.

Before the State of New Jersey Board of Public Utilities, Testimony on behalf of Public Service Electric and Gas Company, Case No. GM00080564, July 26, 2000. Subject: Forecasting the net market value for natural gas transportation and storage contracts.

Before the State of Maine Public Utilities Commission, Rebuttal Testimony on behalf of Central Maine Power Company, Case No. 99-666, June 22, 2000. Subject: Empirical analysis and productivity offset for price cap formula.

Before the Illinois Commerce Commission, Surrebuttal Testimony on behalf of Commonwealth Edison Company, Case No. 99-0013, Phase III, June 12, 2000. Subject: Investigation Concerning the Unbundling of delivery Services under Section 16-108 of the Public Utilities Act.

Before the Illinois Commerce Commission, Rebuttal Testimony on behalf of Commonwealth Edison Company, Case No. 99-0013, Phase III, June 5, 2000. Subject: Investigation Concerning the Unbundling of delivery Services under Section 16-108 of the Public Utilities Act.

## PUBLICATIONS

“Regulation of Natural Gas in the United States, Canada, and Europe: Prospects for a Low Carbon Fuel,” *Review of Environmental Economics and Policy*, Vol. 9, Issue 1 (Winter 2015), pp. 107-127.

“Ensuring Natural Gas Availability,” paper included in MIT Energy Initiative 2013 MITEI Symposium publication *Growing Concerns, Possible Solutions: The Interdependency of Natural Gas and Electricity Systems*, April 16, 2013.

“Marginal Costs with ~~Wings~~ a Ball and Chain: Pipelines and Institutional Foundations for the U.S. Gas Market”, *Economics of Energy and Environmental Policy*, Vol. 1, Issue 1 (2012).

“North American Performance-Based Regulation for the 21<sup>st</sup> Century,” *The Electricity Journal*, May 2012, Vol. 25, Issue 4, (with Agustin J. Ros and Stephen C.W. Collins).

*The Political Economy of Pipelines: A Century of Comparative Institutional Development*, The University of Chicago Press, Chicago and London (2012).

“Real Unbundlings: The Foundation for a Competitive Gas Market in the United States,” *Competition and Regulation in Network Industries*, Vol. 12 (2011), No.4.

"Zone of Reasonableness: Coping with Rising Profitability a Decade after Restructuring," *Public Utilities Fortnightly*, 1 July 2011 (with Kurt Strunk).

“Fueling the Price of Power (and Gas): The Rising Profitability of Pipelines and the Need for Collective Action,” *The Electricity Journal*, June 2011, Vol. 24 Issue No.5. (with Wayne Olson).

“Seeking Competition and Supply Security in Natural Gas: the US Experience and the European Challenge,” in Lévêque, F., Glachant, J-M., Barquín, J., von Hirschhausen, C., Holz, F., and Nuttal, W.J., (eds.), *Security of Energy Supply in Europe*, Edward Elgar, Cheltenham, UK (2010), pp. 21-55.

“Decoupling” for Energy Distributors: Changing 19th Century Tariff Structures To Address 21st Century Energy Markets,” *Energy Law Journal*, Vol. 29, No.1 (2008), pp.157-172.

“Electricity Transmission Cost Allocation: A Throwback to an Earlier Era in Gas Transmission,” *The Electricity Journal*, Vol. 20, Issue 10 (December 2007), pp. 13-25

“Elusive Efficiency and the X-Factor in Incentive Regulation: The Törnqvist v. DEA/Malquist Dispute,” in Voll, S.P., and King, M.K. (Eds.), *The Line in the Sand: The Shifting Boundaries Between Markets and Regulation in Network Industries*, National Economic Research Associates, White Plains, New York (2007), pp. 95-115.

“Theoretische Rechtfertigung des X-Faktors” (“Theoretical Justification for X-Factors”), *Energiewirtschaftliche Tagesfragen*, Vol. 47, No. 3 (March 2007), pp. 50-52.

“Ex Ante or Ex Post? Risk, Hedging and Prudence in the Restructured Power Business,” with Meehan, E.T., and Sullivan, J.E., *The Electricity Journal*, Vol. 19, No 3 (April 2006), pp. 11-29.

“The Thaw: The End of the Ice Age for American Utility Rate Cases,” with Parmesano, H., *The Electricity Journal*, Vol. 17, No. 4 (July 2004), pp.69-74.

“In Defense of the ‘Gold Standard,’” *Public Utilities Fortnightly*, Vol. 141, No. 10 (May, 2003), pp. 12-18.

“Incentive Regulation Meets Electricity Transmission on a Grand Scale: FERC Order No. 2000 and PBR,” *The Electricity Journal*, Vol. 13, No. 2 (May 2000), pp.57-64.

**PUBLICATIONS (CONTINUED)**

“ISO’s Not the Answer for Gas,” *Natural Gas*, Vol. 14, No. 5 (December 1997), pp. 1-6.

*Utility Regulation 1997: Economic Regulation of Utilities and Network Industries Worldwide* (Chapter on United States), Center for the Study of Regulated Industries, (ISBN 1-901597-00-8) 1997.

“X Marks the Spot: How to Calculate Price Caps for the Distribution Function,” *Public Utilities Fortnightly*, Vol. 135, No. 22 (December 1997), p. 52.

“FERC Takes the Wrong Path in Pricing Policy,” *Natural Gas*, Vol. 12, No. 3 (September, 1995), pp. 7-11.

*The Distribution and Pricing of Sichuan Natural Gas*, Chonxing University Press, Chonxing, China (ISBN 7-5624 -1006-2/F 94), 1995.

“Secondary Market Can Compete,” *Natural Gas*, Vol. 11, No. 3 (October 1994), pp. 13-17.

“Gas Pipeline Capacity: Who Owns It? Who Profits? How Much?” *Public Utilities Fortnightly*, Vol. 132, No. 18 (October 1994), pp. 17-20.

“Calculating Fairness,” with Sander, D.O., *Public Utilities Fortnightly*, Vol. 131, No. 21 (November 1993), pp. 25-29.

“The Risk Sharing Strawman,” *Public Utilities Fortnightly*, Vol. 122, No. 1 (July 1988), pp. 24-29.

“The FERC Discounted Cash Flow: A Compromise in the Wrong Direction,” with C. J. Cicchetti, *Public Utilities Fortnightly*, Vol. 120, No.1 (July 1987), pp. 11-15.

**UNPUBLISHED WORKING PAPERS**

“Seeking Competition and Supply Security in Natural Gas: The US Experience and European Challenge,” Prepared for the 1st CESSA Conference, Berlin University of Technology, Berlin, Germany, May 31, 2007.

“The Theory of Relationship Specific Investments, Long-Term Contracts and Gas Pipeline Development in the United States,” paper given at the Conference on Energy Economics and Technology at the Dresden University of Technology, Dresden, Germany, April 21, 2006.

“Benchmarking, Rate Cases and Regulatory Commitment,” paper given at the Australian Competition & Consumer Commission’s Incentive Regulation and Overseas Developments Conference, Sydney, Australia, November 14, 1999

“Price Cap Plans for Electricity Distribution Companies Using TFP Analysis,” with Quinn, M.J., NERA Working Paper, July 23, 1997.

“Rocks on the Road to Effective Regulation: The Necessary Elements of Sound Energy Regulation,” paper presented at the Brazil-U.S. Aspen Global Forum, December 5, 1996.

“Profit Sharing and “Sliding Scale” Regimes,” NERA Working Paper, Quinn, M.J., and Augustine, C., February 29, 1996.

“Four Common Errors in Applying the DCF Model in Utility Rate Cases,” with Sander, D.O., NERA Working Paper, February 1992.

“Pareto Optimality through Non-Collusive Bilateral Monopoly with Cost-Of-Service Regulation,” with Cicchetti, C.J., NERA Working Paper, April 1988.

**RECENT SPEECHES**

“Gas Market in the US: Are there some lessons for Europe?” Speech given at the GIE Annual Conference 2014, Berlin, Germany, June 13, 2014.

“Ensuring Natural Gas Availability,” Speech given at MIT Energy Initiative, 2013 MITEI Symposium, Cambridge, Massachusetts, April 16, 2013.

“Regulating Access to Gas in North America”, Speech given at the Florence School of Regulation, FSR Specialized Training, Florence, Italy, March 13, 2013.

“Natural Gas in the Transformation Process in Europe”, Speech given at Schumpeter Hall, Berlin, Germany. May 15, 2012.

“Security of Supply in Europe”, Speech given at the Florence School of Regulation, State of the EU Conference at the European University Institute. Florence, Italy, May 10, 2012.

“Regulating Gas Pipelines: United States and Europe”, Speech given at Florence School of Regulation, FSR Summer Course Advanced Training on Gas Markets. Florence, Italy, March 23, 2011.

“Foundation for Regulating Pipelines”, United States and Europe: Two Different Regulatory Worlds. Speech given at the Florence School of Regulation Summer Course on Regulation of Energy Utilities. Florence, Italy, June 30, 2010.

“Governance and the Electricity Sector”, Speech given at the Governance and Regulation in the Electricity Sector Conference. Toronto, Ontario, June 4, 2010.

“Public Utility Companies and Regulatory Risk”, Speech given at the Saul Ewing’s 4<sup>th</sup> Annual Public Utility Symposium. Philadelphia, PA, May 24, 2010.

“It’s All About Inland Transportation”, US Gas Pipelines Reflect What’s Happening in Europe. Speech given at the Florence School of Regulation Specialized Training on Regulation of Gas Markets. Florence, Italy, March 24, 2010.

“Windmills and Wires: FERC Rate Cases, Transmission Cost Allocation, and Renewable Power Development”, Speech given at Law Seminars International Sixth Annual National Conference on Today’s Utility, Las Vegas, Nevada, February 11, 2010.

“The East-West Energy Corridor and Europe’s Energy Security”, Speech given at the Brookings Institution conference on Turkey, Russian and Regional Energy Strategies, Washington D.C., July 15, 2009.

“Understanding U.S. Gas Pipelines”, Speech given at Florence School of Regulation, FSR Summer School on Regulation of Energy Utilities. Florence, Italy, June 24, 2009.

“Vertical Relations in Energy Markets: On the Role of Contracts and Other Legal Entitlements in the U.S. Gas Transport Market”, Speech given at Vienna University of Economics and Business, Workshop 2009. Vienna, Austria, May 29, 2009.

“Institutional, Transactional and Political Barriers to Competitive Gas Market in Europe: Europe’s Pipelines and Economics”, Speech given at Florence School of Regulation Workshop: Tariffs for European Gas Transmission Networks. Florence, Italy, March 6, 2009.

“Cost recovery mechanisms: Options and where each works best; what approach is most likely to get necessary projects built”, Speech given at Law Seminars International, Utility Rate Case: Issues and Strategies 2009. Las Vegas, Nevada, February 5, 2009.

**RECENT SPEECHES (CONTINUED)**

“Alaska as a Gas Supplier: Where is the North Slope Gas Going, and How?” Speech given at the Law Seminars International, Energy in Alaska conference. Anchorage, Alaska, December 8-9, 2008.

“Maintaining Adequate Infrastructure in the Natural Gas and Electric Industries.”, Speech given at the Increasing Longer-Term Stability in Energy Markets conference sponsored by the Institute for Regulatory Policy Studies. Springfield, Illinois, May 1, 2008.

“Rate Decoupling and Associated Rate and Cost Issues,” Speech given before the New Hampshire Public Utilities Commission, Concord, New Hampshire, November 6, 2007.

“Electricity Transmission Cost Allocation in New England: A Throwback to an Earlier Era in Gas Transmission.” Speech given at Law Seminars International, Energy in the Northeast conference, Boston, Massachusetts, October 18-19, 2007.

“Rate Decoupling and Associated Rate and Cost Issues.” Speech given at American Gas Association (AGA) Legal Forum. Vail, Colorado, July 15- 17, 2007.

“Seeking Competition and Supply Security in Natural Gas: The US Experience and European Challenge” Speech given before the 1<sup>st</sup> CESSA Conference, Berlin, Germany, May 31-June 1, 2007.

“Toward a Regulatory Equilibrium in Gas Hedging,” Speech given before the Electric Utility Consultants’ Conference: Utility Hedging in an Era of Natural Gas Price Volatility, Arlington, Virginia, October 4, 2006.

“A Gas Network to Meet the Needs of New Electricity Generators,” Speech given before the Ontario Energy Association, Ontario, Canada, June 23, 2005.

“Forks in the Road for Electricity Transmission,” Speech given at the Electricity Industry Regulation and Restructuring conference by The Salt River Project and The Arizona Republic, October 11, 2002.

“Role of Yardsticks in Cost & Service Quality Regulation,” Speech to the London Regulated Industries Group, November 30, 2000.

“Natural Gas Issues: Retail Competition, LDC Gas Rate Unbundling, and Performance Based Rates”, presented at the Wisconsin Public Utility Institute, November 17, 2000.

“Performance Based Ratemaking (PBR) in Restructured Markets,” Speech to Edison Electric Institute Seminar in San Antonio Texas, April 27, 2000.

“Benchmarking versus Rate Cases and the Half Live of Regulatory Commitment,” Speech given at the Australian Competition & Consumer Commission’s Incentive Regulation and Overseas Development Conference, Sydney, Australia, November 19, 1999.

“Benchmarking, Rate Cases and Regulatory Commitment,” Speech given at the Australian Competition & Consumer Commission’s Incentive Regulation and Overseas Developments Conference, Sydney, Australia, November 14, 1999.

“Gas and Electricity Sector Convergence: Economic Policy Implications,” Presentation at Energy Week ’99, “The Global Shakeout,” The World Bank, Washington D.C., April 6-8, 1999.

“Gas and Electricity Sector Convergence: Economic Policy Implications,” Presentation/Training at the Economic Development Institute, The World Bank, Washington D.C., December 8-9, 1998.

**RECENT SPEECHES (CONTINUED)**

“Sustainable Regulation for Russian Oil Pipelines,” Presentation at Pipeline Transportation: A Linkage Between Petroleum Production and Consumers, Moscow, June 25, 1997.

“Rocks on the Road to Effective Regulation,” Presentation to Brazil/US Aspen Global Forum, Aspen, Colorado, December 5-8, 1996.

“Stranded Cost Case Studies in the Gas Industry: Promoting Competition Quickly,” —Speech presented at the MCLE Seminar: Retail Utility Deregulation, Boston, MA, June 17, 1996.

“Why Regulate Anyway? The Tough Search for Business-As-Usual Regulation,”—Panelist at St. Louis 1996, The Fifth Annual DOE-NARUC Natural Gas Conference, St. Louis, Missouri, April 30, 1996.

“Antitrust for Utilities: Treating Them Just Like Everyone Else”—Panelist at St. Louis 1996, The Fifth Annual DOE-NARUC Natural Gas Conference, St. Louis, Missouri, April 29, 1996.

“Natural Gas Pricing: The First Step in Transforming Natural Gas Industries”—One-Day Interactive Workshop on Pricing Strategy at The Future of Natural Gas in the Mediterranean Conference, Milan, Italy, March 27, 1996.

“Open Access in Gas Transmission,”—Speech given at the New England Chapter of the International Association for Energy Economics, Boston, Massachusetts, December 13, 1995.

“Light-Handed Regulation for Interstate Gas Pipelines,”—Speech given at the Twenty-Seventh Annual Institute of Public Utilities Conference, Williamsburg, Virginia, December 12, 1995.

“Ending Cost of Service Ratemaking,”—Speech given to the Electric Industry Restructuring Roundtable, Boston, Massachusetts, October 2, 1995.

“Promoting Markets for Transmission: Economic Engineering or Genuine Competition?”—Speech given at The Forty-Ninth Annual Meeting of the Federal Energy Bar Association, Inc., May 17, 1995.

“End-Use Competition Between Gas and Electricity: Problems of Considering Gas and Electric Regulatory Reform Separately,”—Panelist on panel at ORLANDO ‘95, The Fourth Annual DOE-NARUC Natural Gas Conference, Orlando, Florida, February 14, 1995.

“Incremental Pricing: Not a Quantum Leap,”—Speech given at the 1995 Natural Gas Ratemaking Strategies Conference, Houston, Texas, February 3, 1995.

“The Feasibility of Competition in the Interstate Pipeline Market,”—Speech given at the Institute of Public Utilities Twenty-Sixth Annual Conference, Williamsburg, Virginia, December 13, 1994.

“A Mirror on the Evolution of the Gas Industry: The Views from Within the Business and from Abroad,”—Speech given at the 1994 LDC Meeting-ANR Pipeline Company, October 4, 1994.

“Creating New Markets Out of Old Utility Services,” —Speech given at the Fifteenth Annual NERA Santa Fe Antitrust and Trade Regulation Seminar, Santa Fe, New Mexico, July 9, 1994.

“Sources of and Prospects for Privatization in Developed and Underdeveloped Economies,” —Speech given at the Spring Conference of the International Political Economy Concentration and the National Center for International Studies at Columbia University, New York, March 30, 1994.

“Experiencias en el Desarrollo del Mercado de Gas Natural (Experiences in gas market development),” —Speech given at the conference “Perspectivas y Desarrollo de Mercado de Gas Natural,” Centro de Extensión de la Pontificia Universidad Católica de Chile, November 16, 1993.

**RECENT SPEECHES (CONTINUED)**

“The Role of Rate of Return Analysis in a More Progressive Regulatory Environment,”—Speech given at the Twenty-Fifth Financial Forum held by the National Society of Rate of Return Analysts, Philadelphia, Pennsylvania, April 27, 1993.

“Privatization of Energy and Natural Resources,”—Speech given at the International Privatization Conference “Practical Issues and Solutions in the New World Order,” New York, New York, November 20, 1992.



**RECENT INTERNATIONAL REPORTS**

“Consultation Paper: Development of Approaches Towards Regulating Tariffs for Petroleum Pipelines, Storage and Loading Facilities in South Africa.” Report prepared for the National Energy Regulator of South on the determination of economically feasible approaches towards establishing revenue requirements, regulating the setting/approval of tariffs, and developing rules, guidelines and framework regarding regulatory accounts for the petroleum pipelines, storage, and loading facilities in South Africa. December 14, 2006.

“Regulatory Assessment of the Turkish Electricity Sector.” Report prepared for Prisma Energy on the examination of the economic and regulatory risks facing investors in the privatization of the energy infrastructure of Turkey. December 6, 2006.

“Calculation of the X-Factor in the 2nd Reference Report of the Bundesnetzagentur.” Report prepared for E. ON Ruhrgas, Germany: Design of a regulatory method based on comparison of average tariffs, consistent with new German legislation on the regulation of gas transmission networks. April 21, 2006. (with Graham Shuttleworth and Michael Kraus).

A Critique of CEPA’s Report on “Productivity Improvements in Distribution Network Operators:” A report for EDF Energy (with Graham Shuttleworth). December 16, 2003.

Advised on Fare Regulation Issues related to the Impending Merger of the MTRC and KCRC Railroad Companies in Hong Kong, Mercer Consulting on behalf of MTRC, 2003-2004.

“Natural Gas Pipeline Access Regulation”. Report prepared for BHP Petroleum Pty Ltd., May 31, 2001.

“Manual de Procedimientos para el Sistema Uniforme de Cuentas Regulatorias Eléctricas (SUCRE) de México” (April 2000). The report includes an explanation of each of the accounts needed for regulation, recording procedures and the structure the information should take when reporting to the regulator.

“Investigation into Petronets’ Liquid Fuels Pipeline Tariffs: Final Report” (March 9<sup>th</sup>, 2000). This report presents NERA opinions in the quasi-arbitration of the tariffs disputes in the oil industry in South Africa for their liquids pipelines.

“Seeking Genuine Gas Competition in NSW”, prepared for BHP Petroleum Pty. Ltd., February 18, 2000.

“Análisis y Revisión del Recurso de Revocatoria Interpuesto por la Compañía Boliviana de Energía S.A. (COBEE) a la Resolución SSDE N° 92/99 de la Superintendencia de Electricidad” (September 6, 1999). This report represents NERA’s opinion on COBEE’s appeal in the electricity tariff review process in Bolivia (report in Spanish).

“Gas Sector Regulation Consultancy Services” report prepared for the Vietnam Oil and Gas Corporation, August 10, 1999.

“Natural Gas Demand Estimation for Guatemala, Honduras and El Salvador” (July 19<sup>th</sup>, 1999). This report done for an international consortium of companies presents calculations of prices and volumes of natural gas demand for three Central American countries if a pipeline is built from Mexico.

“Comments on East Australian Pipeline Limited Access Arrangements: (July 15, 1999). Report prepared on behalf of Incitec Ltd.

“Supplementary Submission to IPART on AGLGN’s Proposed Access Arrangements” on behalf of Incitec Limited (April 27<sup>th</sup>, 1999). This submission discusses reload practices, customer

**RECENT INTERNATIONAL REPORTS (CONTINUED)**

contributions, operating expenses and recalculates charges for a user of the distribution network in New South Wales, Australia.

“Supplementary Submission to IPART on AGLGN’s Proposed Costs and Tariffs” on behalf of BHP (April 15th, 1999). This submission explains how NERA recalculated charges for AGLGN in New South Wales, Australia.

“Initial Comments on AGLGN’s Revised Access Arrangement Information” on behalf of BHP (March 20th, 1999). This submission presents NERA’s comment to AGLGN submission to IPART in New South Wales, Australia.

“International Restructuring Experience” (February 12th, 1999). This paper surveys a number of countries whose experience of restructuring and competition in the electricity sector is directly relevant to the proposed changes in Mexico – Argentina, Australia, Chile, Guatemala, New Zealand, Norway, Spain, the US and the UK

“Report I: Review of the Regulatory Framework” (January 18th, 1999). This report presents the options for a natural gas framework in Peru.

“Conceptual Framework for the Reform of the Electricity Sector in Mexico: White Paper” (November 24th, 1998). This report represents the White Paper for restructuring of the electricity sector in Mexico which is being used in Congress for debate.

“Precios del Gas Natural para la Generación de Electricidad en el Perú” (November 16th, 1998). This report analyzes different alternatives for the treatment of natural gas prices in the electricity tariff model (report in Spanish).

“Tariffs and Subsidies: Report for the Tariffs Group” (November 10th, 1998). This report presents recommendation on the path for tariffs and subsidies for 1999 to the Electricity Tariffs Group of the Government of Mexico.

“Gasoducto México-Guatemala: Informe Final” (October 22nd, 1998). This report analyzes the legal and regulatory framework in both Mexico and Guatemala and costs and volumes for the building of a natural gas pipeline connecting both countries. A copy of the report was given by President Zedillo (Mexico) to President Arzú (Guatemala) (report in Spanish).

“Checks and Balances in Regulating Power Pools: Seven case Studies. A Report for the Electricity Pool of England and Wales” (September 10th, 1998). This report surveys the regulation of power pools in electricity industries around the world.

“Fuels Policy Group: Recommendations” (September 11th, 1998). This report presents recommendations to the Government of Mexico on their fuels policies for the electricity sector.

“Análisis de Costos e Inversiones. Revisión Tarifaria de Transener” (August 25, 1998). Report given to ENRE (the Argentinean electricity regulator) on behalf of a Consortium of Generators on the analysis of costs and investments to be considered for the revenue requirement of the electricity transmission company (report in Spanish).

“Central America Pipeline: Regulatory Analysis and Proposal” (July 28, 1998). This report presents the regulatory analysis and development of a fiscal, legal and commercial framework proposal for gas import, transportation, distribution and marketing in El Salvador, Honduras and Guatemala regarding the proposed Central American Pipeline.

“Energy Regulation in El Salvador” (July 28, 1998). This report presents a deep analysis of the electricity and natural gas regulatory, legal and tax frameworks in El Salvador.

**RECENT INTERNATIONAL REPORTS (CONTINUED)**

“Energy Regulation in Guatemala” (July 28, 1998). This report presents a deep analysis of the electricity and natural gas regulatory, legal and tax frameworks in Guatemala.

“The Cost of Capital for Gas Transmission and Distribution Companies in Victoria” (June 22, 1998). Report prepared for BHP Petroleum Pty Ltd.

“Principios Económicos Básicos de Tarificación de Transmisión Eléctrica. Revisión Tarifaria de Transener” (May 26, 1998). The main purpose for this report was to provide an economic and regulatory analysis of laws, decrees, license and documents of the tender to provide advise in the tariff review of Transener (the electricity transmission company in Argentina), to present an economic analysis of transmission tariffs and to provide an opinion on specific topics to be discussed in the public hearing. This report was written for a consortium of generators in Argentina (reports in English and Spanish)

“Asesoría en la Fijación de Tarifas de Transener y Normativa del Transporte, Benchmarking Study” (May 26, 1998). This report compares the costs of Transener (the electricity transmission company in Argentina) with those of other companies elsewhere for a consortium of generators (the electricity transmission company in Argentina).

“International Regulation Tool Kit: Argentina” (March 20, 1998). This document describes the natural gas regulatory framework in Argentina for BG.

“Tarificación de los Servicios Que Prestan las Terminales de Gas LP” (January 9, 1998). The final report given to PEMEX Gas y Petroquímica Básica (México) for the determination of rates for LPG terminals.

“NERA-Pérez Compañía Distribution Tariff Model” (January 5, 1998). This report explains the methodology behind NERA’s calculations of distribution tariffs for Pérez Compañía in Monterrey.

“Monterrey Natural Gas Market Assessment,” (January 5, 1998). A series of reports were written to present the results of the market study of the demand for natural gas in the geographic zone of Monterrey to a company interested in bidding for the natural gas distributorship.

“Resolving the Question of Escalation of Phases (bb) and (cc) Under the Maui Gas Sale and Purchase Contract”, prepared for the New Zealand Treasury, December 16, 1997.

“Timetable and Regulatory Review for the Monterrey International Public Tender,” (December 5, 1997). A description of the necessary steps to bid for a distribution company as well as an explanation and analysis of natural regulations in Mexico for Pérez Compañía.

“Economic Issues in the PFR for 18.3.1(I)(bb) & (cc)”, prepared for the New Zealand Treasury, November 17, 1997.

“NERA’s Distribution Tariff Model” (October 29, 1997). This report explains the methodology behind NERA’s calculations of distribution tariffs for MetroGas.

“Evaluation Design Standards for MetroGas,” (October 24, 1997). This report dealt with the analytical support resulting from work with MetroGas to create a meticulously-documented security criterion analysis that supported its efforts to obtain due recognition—and appropriate tariff treatment—for its costs.

“Ghana Natural Gas Market Assessment,” prepared for the Ministry of Mines and Energy, Ghana (March-July, 1997). A series of four reports assessing prospective gas demand usage and netback prices for a number of proposed pipeline project alternatives.

**RECENT INTERNATIONAL REPORTS (CONTINUED)**

“Final Report for Russian Oil Transportation & Export Study: Commercial, Contractual & Regulatory Component,” prepared for The World Bank, June 25, 1997.

Response to FIEL’s criticisms regarding NERA’s report “Cálculo del Factor de Eficiencia (X)” (June 2, 1997).

“Impacts on Pemex of Natural Gas Regulations” prepared for Pemex Gas y Petroquímica Básica México, May 21, 1997.

“Market Models for Victoria’s Gas Industry: A Review of Options,” April 1997, prepared for Broken Hill Proprietary (BHP) Petroleum, to propose an alternative model for gas industry restructuring in Victoria, Australia.

“New Market Arrangements for the Victorian Gas Industry,” prepared for Broken Hill Proprietary Petroleum; March 13, 1997.

“CEG Privatization: Comments to the Regulatory Framework,” prepared for Capitaltec Consultoria Economica SA describing our comments with respect to the regulatory framework and the license proposed in the privatization of Riogas and CEG in Rio de Janeiro, Brazil; March 7, 1997.

“Determination of the Efficiency Factor (X),” prepared for ENARGAS, Argentina, January 24, 1997.

“Determination of Costs and Prices for Natural Gas Transmission,” prepared for Pemex Gas y Petroquímica Básica, México, December 19, 1996.

“Regulating Argentina’s Gas Industry,” a report prepared for The Ministry of Economy and The World Bank, November 26, 1996.

“Open Access and Regulation,” prepared for Gascor, in the State of Victoria, Australia; (October 2, 1996).

“A Review and Critique of Russian Oil Transportation Tariffs (Russian Oil Transportation & Export Study; Commercial, Contractual & Regulatory Component),” prepared for The World Bank, June 13, 1996.

“Tariff Options for Transneft (Russian Oil Transportation & Export Study; Commercial, Contractual & Regulatory Component),” prepared for The World Bank, June 6, 1996.

“Comments on the Proposed Amendments to the Regulation of Airports in New Zealand,” prepared for the New Zealand Parliament Select Committee hearings on the regulation of monopolies, March 13, 1996.

“Evaluating the Shell Camisea Project,” prepared for Perupetro S.A., Government of Peru, December 8, 1995.

“Towards a Permanent Pricing and Services Regime,” prepared for British Gas, London, England, November, 1995.

“Final Report: Gas Competition in Victoria,” prepared for Gas Industry Reform Unit, Office of State Owned Enterprises, June 1995.

“Natural Gas Tariff Study,” prepared for the World Bank, May 1995, consisting of:

*Principles and Tariffs of Open-Access Gas Transportation and Distribution Tariffs*  
*Handbook for Calculating Open-Access Gas Transportation and Distribution Tariffs*

**RECENT INTERNATIONAL REPORTS (CONTINUED)**

“Economic Implications of the Proposed Enerco/Capital Merger,” prepared for Natural Gas Corporation of New Zealand, December 1994.

“Contract Terms and Prices for Transportation and Distribution of Gas in the United States,” prepared for British Gas TransCo, November 1994.

“Economic Issues in Transport Facing British Gas,” prepared for British Gas plc, December 1993.

“Overview of Natural Gas Corporation's Open-Access Gas Tariffs and Contract Proposals,” prepared for Natural Gas Corporation of New Zealand, October 1993.

**PARTIAL LIST OF CLIENTS SERVED WORLDWIDE****ELECTRIC UTILITY**

AEP Energy Services, Inc  
 Alberta Power Limited  
 American Electric Power Company  
 Atlantic Electric Company  
 Boston Edison Company  
 Central Hudson Gas and Electric  
 Central Maine Power Company  
 Central Power & Light Company  
 Commonwealth Edison Company (Unicom/Exelon)  
 Commonwealth Energy System  
 Consolidated Edison Company of New York, Inc  
 Conowingo Power Company  
 Duquesne Light Company  
 Edison Electric Institute  
 Entergy Gulf States, Inc  
 Florida Power and Light Company  
 Green Mountain Power Company  
 Long Island Lighting Company  
 Massachusetts Municipal Wholesale Electric  
 Company  
 Massachusetts Electric Company  
 Nantahala Power Company  
 New York State Electric & Gas Corporation  
 Niagara Mohawk Power  
 Ohio Power Company  
 Orange & Rockland Utilities  
 Pennsylvania Power and Light Company  
 Pennsylvania Power Company  
 Philadelphia Electric Company  
 PJM electricity transmission owners  
 Public Service Company of New Hampshire  
 Public Service Company of New Mexico  
 Public Service Electric and Gas Company  
 Portland General Electric Company  
 Reliant Energy HL&P  
 Rochester Gas and Electric Corp.  
 Sierra Pacific Power Corporation  
 Southwest Electric Power Company  
 Southwestern Public Service Company  
 Tampa Electric Company  
 Texas-New Mexico Power Company  
 TXU Electric Company  
 United Illuminating Company  
 UtiliCorp Networks Canada  
 Virginia Electric and Power Company  
 West Penn Power Company  
 West Texas Utilities Company  
 Western Massachusetts Electric Co.

**GAS UTILITY**

ARKLA, Inc.  
 Atlanta Gas Light Company  
 Bay State Gas Company  
 Berkshire Gas Company  
 Blackstone Gas Company  
 Boston Gas Company  
 Bristol & Warren Gas Company  
 British Gas plc  
 Brooklyn Union Gas Company  
 Canadian Western Natural Gas  
 Chattanooga Gas Company  
 Colonial Gas Company  
 Commonwealth Gas Company  
 Connecticut Natural Gas Corp.  
 Consolidated Gas Supply Corp.  
 Elizabethtown Gas Company  
 Empire State Pipeline Company  
 ENAGAS (Spain)  
 EnergyNorth, Inc.  
 Essex County Gas Company  
 Fall River Gas Company  
 Fitchburg Gas & Electric Light Company  
 Gas and Fuel Corporation of Victoria  
 Gateway Pipeline Company  
 Granite State Gas Transmission, Inc.  
 Great Falls Gas Company  
 Holyoke, Mass. Gas & Electric Dept.  
 ICG Utilities (Ontario) Ltd.  
 KN Energy, Inc.  
 Middleborough Municipal Gas & Electric  
 National Fuel Gas Distribution Corp.  
 Natural Gas Corporation of New Zealand  
 Natural Gas Pipeline of America  
 Norwich Department of Public Utilities  
 Pacific Gas Transmission  
 Pemex Gas y Petroquímica Básica  
 Pennsylvania Gas and Water Company  
 Peoples Gas Light and Coke Company  
 Providence Gas Company  
 Southern Connecticut Gas Company  
 Southwest Gas Corporation  
 Transwestern Pipeline Company  
 Valley Gas Company  
 Washington Gas Light Company  
 Westfield Gas & Electric Light Dept.  
 Wisconsin Gas Company  
 Yankee Gas Services Company

**PARTIAL LIST OF CLIENTS SERVED WORLDWIDE (CONT.)**

**TELEPHONE UTILITY**

Centel Corporation  
Chichester Telephone Company  
Community Service Telephone Company  
Continental Telephone Company of Illinois  
General Telephone of Pennsylvania  
General Telephone Company of Ohio  
Kearsarge Telephone Company  
Meriden Telephone Company  
Pacific Bell Telephone Company  
Tipton Telephone Company

**PARTIAL LIST OF CLIENTS SERVED WORLDWIDE (CONT.)****REGULATORY AND GOVERNMENT**

Delaware Public Service Commission

re: Delmarva Power & Light Company

District of Columbia Public Service Commission

re: Potomac Electric Power Company  
Washington Gas Light Company

Massachusetts Municipal Wholesale Electric Company

The Government of Chile

Gas industry regulations

The Government of Argentina

Plan for privatized rail freight industry regulation

The Government of Tanzania

Natural gas development and regulation plan for Songo Songo Island gas reserves.

Financing the development of gas reserves on Songo Songo Island with emphasis on payment guarantee mechanisms for foreign exchange.

The World Bank

re: Natural gas tariffs for Polskie Gornictwo Naftowe i Gazownictwo  
(The Polish Oil and Gas Company)

re: Natural gas transport and distribution tariffs for Gas del Estado  
(The Argentine State-owned gas utility)

re: Natural gas development for the Moroccan Gas System.

re: Natural gas transport and distribution tariffs for the Bolivian Gas Industry.

re: Natural gas development plan for Sichuan province of China.

**OTHER**

Air New Zealand

BHP Petroleum Pty Ltd

Centel Corporation

General Electric Company

Intel Corporation

Jamaica Water Supply Company

Nucor Steel Corporation

Parsons Brinckerhoff Development Group

**MEMBERSHIP IN  
PROFESSIONAL ORGANIZATIONS**

The American Economic Association





Arnaud RENAUD, PhD

Président Directeur Général

[arnaud.renaud@artelys.com](mailto:arnaud.renaud@artelys.com) - +33 (0)1 44 77 89 00

## Expérience

### Directeur de projets et Président Directeur Général – 15 ans – Artelys, France

- Spécifications et réalisation d'un logiciel de planification court terme de la production électrique.
- Etude comparée de différentes stratégies de prix dans le domaine de l'énergie.
- Analyse des mécanismes de formation des prix sur les marchés gaziers.
- Etude de modèles de sûreté dans les réseaux pour la mise au point d'un logiciel d'aide au choix de cibles militaires.
- Études sur la tarification du transport de gaz.
- Réalisation d'un état de l'art sur les techniques de yield management et de tarification dynamique : algorithmes et impact sur les organisations.
- Rédaction d'un état de l'art sur la tarification dynamique et son application dans le secteur de l'énergie.
- Valorisation d'un portefeuille de contrats d'approvisionnement et d'actifs physiques.
- Spécification d'un logiciel permettant le pilotage de relations commerciales par détection de signaux faibles.
- Etudes de modélisation sur l'optimisation de la gestion des stocks hydrauliques dans le cadre de marchés électriques concurrentiels.
- Études dans le domaine de l'optimisation stochastique et de la gestion du risque pour la gestion de stocks hydroélectriques.
- Spécification, implémentation et comparaison de différents modes de valorisation et d'optimisation d'un portefeuille mixte.
- Analyse de l'impact des erreurs de prévisions sur le fonctionnement d'une supply chain.
- Optimisation de paramètres de contrôle pour la fabrication de fibres optiques : étude et développement d'une application.
- Mission de conseil sur le dimensionnement à long terme de portefeuilles d'actifs gaziers.
- Mission de conseil concernant les méthodes d'évaluation d'un portefeuille d'actifs gaziers

- Modélisation et optimisation du routage dans les réseaux de télécommunication avec contraintes non linéaires de qualité de service.
- Optimisation de la qualité de service dans les centres d'appels.
- Études de modélisation sur l'optimisation d'une politique d'achat pluriannuelle d'une flotte de véhicules par programmation linéaire en nombres entiers.
- Etudes de modélisation et développement de méthodes de décomposition pour des problèmes de dimensionnement de réseaux de télécommunications.
- Modélisation et définition d'algorithmes pour l'optimisation de la gestion de réseaux gaziers.
- Orientation des ouvrages actifs dans les réseaux de transport de gaz : étude de modélisation.
- Modélisation et réalisation d'un logiciel d'optimisation de l'achat des pertes d'électricité.
- Etudes concernant le transport d'électricité.
- Étude de modélisation et algorithmique concernant l'optimisation de la gestion de réseaux d'eau.
- Spécification fonctionnelle d'un outil d'aide à la décision pour la planification du transport de fret.
- Etudes algorithmiques pour un mécanisme de coordination des prix de marchés entre plusieurs bourses de l'électricité européennes.
- Organisation et réalisation partielle d'un cours sur le « Risk Management ».
- Optimisation de la gestion des stations de compressions sur un réseau gazier
- Prévisions de volumes d'appels.
- Optimisation de la planification de centres d'appel.
- Analyse des mécanismes des formations des prix sur les marchés gaziers.
- Etudes concernant la tarification du transport d'électricité.

## Responsable du pôle optimisation du département

### Méthodes d'Optimisation et de Simulation – 1 an – Électricité de France

- Missions d'audit et de conseil internes et externes (algorithmes et modélisation).
- Mise au point de formation et d'actions de communication.
- Coordination technique des actions de recherche (internes ou en collaboration avec des laboratoires de recherche universitaires) dans le domaine de l'optimisation.

### Responsable de projet – 3 ans – Électricité de France

Responsable d'un projet de recherche et développement sur l'optimisation à moyen terme de la gestion de la production électrique

### Chargé d'études économiques – 8 ans – Département planification des réseaux, Électricité de France

En charge d'études économiques et statistiques pour l'évaluation des coûts de développement des réseaux et pour la définition de règles de

planification pour ces réseaux. Définition et développement d'outils de simulation.

## Formation

Thèse en Mathématiques et Automatique, (Mention très honorable, avec félicitations du jury) – 1993 – Ecole des Mines de Paris, France

Diplôme d'Etudes Approfondies en Mathématiques Appliquées, option Statistiques, (Mention Très Bien) – 1984 – France

Ingénieur de l'Ecole Nationale Supérieure des Techniques Avancées (ENSTA), option Analyse de Systèmes – 1983 – Paris, France

## Enseignement et formation

Université Paris I Panthéon-Sorbonne : Professeur associé à temps partiel en charge du cours d'optimisation numérique en Master MMMEF (Méthodes et Modèles Mathématiques pour l'Économie et la Finance) – Depuis 2006 – France





Guillaume TAREL, PhD

Chef de projet

[guillaume.tarel@artelys.com](mailto:guillaume.tarel@artelys.com)

## Expérience

### Vice-Président – 3 ans – Artelys, Canada

Consultant pour des compagnies grandes consommatrices d'énergie, agences gouvernementales, producteurs d'énergie, autorités de régulation, opérateurs de transmission (gaz et électricité)

Développement, vente et support d'outils de modélisation et d'optimisation mathématique pour les systèmes énergétiques (notamment planification court-terme de la production électrique, planification de réseaux de transport électrique)

### Consultant en optimisation – 2 ans – Genève, Suisse

Étude technico-économique sur l'opportunité et l'impact des réseaux électriques intelligents (smart-grids) sur le système énergétique Suisse dans le cadre de la stratégie 2050 de l'Office Fédéral Suisse de l'Énergie

Étude technico-économique portant sur l'adaptation au changement climatique en Midi-Pyrénées pour le compte de l'ADEME (ministère français de l'environnement)

### Chercheur Post-Doctoral – 6 mois – Laboratoire de recherche en économie REME, Lausanne, Suisse

Contribution à la modélisation et l'analyse de l'influence sur l'économie des politiques de limitation des émissions de gaz à effet de serre (modélisation, modèles économiques)

## Formation

- Doctorat de Physique – 2007-2011**  
École Polytechnique Fédérale, Lausanne, Suisse  
Simulation numérique de systèmes physiques (opto-électronique quantique)  
Analyse de données expérimentales, simulation (éléments finis, différences finies, Monte-Carlo)
- Diplôme d'ingénieur physicien – 2005-2007**  
École Polytechnique Fédérale, Lausanne, Suisse
- Diplôme d'ingénieur – 2003-2005** – École Centrale de Paris, Paris, France

## Compétences

### **Modélisation de systèmes énergétiques, optimisation, analyse de données**

**Logiciels:** Matlab, Python, Excel, VBA

**Langues :** Français et anglais (courants). Allemand (avancé)

## Associations professionnelles

- Permis restrictif temporaire en Génie**  
Ordre des ingénieurs du Québec, membre 5056681
- CIGRÉ (conférence internationale des grands réseaux électriques)**  
Comité national Canadien, membre individuel 620150011

## Publications

- Étude sur le potentiel du stockage d'énergies, Novembre 2013  
Pour le compte de la DGCIS, l'ADEME (gouvernement français) et l'ATEE.
- Assessing the Future of Renewable and Smart Grid Technologies in Regional Energy Systems.*  
*Swiss Journal of Economics and Statistics*, 148(2):229-273, 2012
- Disponible sur demande: 5 publications et un chapitre de livre dans le domaine de la simulation (Monte-Carlo, analytique) et de l'analyse de grands volumes de données en optoélectronique quantique. Plus de 100 citations.