

# 3rd Annual Workshop on the Economics of Electricity Policy and Markets



**Date:** Tuesday, October 22, 2019

**Time:** 8:00 am – 5:00 pm

**Location:** Ivey Donald K. Johnson Centre in Toronto

## WORKSHOP THEME

***Lessons learned from 20 years of electricity sector restructuring: What will be the impact of distributed energy technologies?***

Roughly 20 years ago, many jurisdictions began restructuring their electricity sectors with the goal of creating new governance arrangements that would provide long-term benefits to consumers. The basic architecture of restructuring involved the separation of potentially competitive segments (generation and retail) from the natural monopoly wires segments (transmission and distribution), the creation of competitive wholesale and retail markets for energy, and performance-based regulation of the monopoly wires businesses. At the time, electricity was produced by a small number of privately owned large-scale generators connected to the bulk transmission system and delivered over the monopoly wires to passive consumers. Fast-forward 20 years and distributed energy solutions are becoming more cost-competitive with grid-sourced electricity, and advancements in digital technologies could soon present consumers with competitive alternatives to centralized grid-sourced electricity. This workshop will seek the insights of academics, practitioners, and industry experts on how existing industry structures need to adapt in the face of the changing technological landscape to provide long-term benefits to consumers.

# WORKSHOP AGENDA

Tuesday, October 22, 2019

8:00 am **Continental Breakfast**

8:45 am **Introductory Remarks** – Brian Rivard (Ivey Business School)

9:00 am **Session 1: Restructuring revisited – Competition in electricity distribution**

Moderator: Pierre-Olivier Pineau (HEC Montreal and CAEE)

Speakers:

- Scott Burger (Form Energy)
- Sarah Simmons (Power Advisory)
- Ben Ullman (Opus One Solutions)

10:30 am **Morning Refreshments**

11:00 am **Session 2: Resource adequacy mechanisms revisited**

Moderator: Jessica Savage (IESO)

Speakers:

- Frank Wolak (Stanford University)
- Blake Shaffer (University of Calgary)
- Kathleen Spees (The Brattle Group)

12:30 pm **Lunch**

1:00 pm **Keynote Address** – Meredith Fowlie (UC Berkeley)

2:00 pm **Session 3: Rate design and fixed cost recovery revisited**

Moderator: Cheryl Terry (AESO)

Speakers:

- Ian Schneider (MIT)
- AJ Goulding (London Economics)
- Vittoria Bellissimo (IPCAA)

3:30 pm **Afternoon Refreshments**

4:00 pm **Session 4: Key priorities for the future of electricity markets**

Moderator: Brandon Schaufele (Ivey Business School)

Speakers:

- Kevin Dawson (AESO)
- Michael Lyle (IESO)

4:45 pm **Closing Remarks** – Guy Holburn (Ivey Business School)

5:30 pm **Cocktail Reception and Dinner at Leña Restaurante** – Keynote Remarks from Andy Ott, former CEO, PJM

## SPEAKERS AND MODERATORS



### **Vittoria Bellissimo**

Vittoria Bellissimo is the Executive Director of the Industrial Power Consumers Association of Alberta (IPCAA), a market, policy and regulatory advocacy organization that includes consumers from oil and gas, pipelines, agriculture, petrochemicals and steel industries. IPCAA is the largest electricity consumer organization in Alberta, and its members have an active interest in promoting a competitive electricity market. Vittoria also serves as the Vice-Chair of Energy Efficiency Alberta. Previously, Vittoria worked in Market Structure at the Ontario Power Authority, and had roles in procurement at the Ontario Ministry of Energy, renewable energy research at the Scottish Parliament, and Construction IT at the University of Maribor, Slovenia. Vittoria has a M.Sc. in Environmental Sustainability from the University of Edinburgh, Scotland and a B.Sc. in Mathematics and Engineering from Queen's University, Canada. She is a licensed professional engineer (Ontario).



### **Scott Burger**

Scott Burger is the Analytics Lead at Form Energy, where he heads the development of Form's energy storage analytics products. Scott is also a Fellow on the World Economic Forum's (WEF) Global Future Council on Energy and a Lecturer at the Massachusetts Institute of Technology (MIT). Scott has authored numerous peer-reviewed papers on topics ranging from the structure of the electric power sector, to electricity rate design, the economics of distributed energy resources, clean technology investment and innovation, and the impact of innovative technologies on climate change. As a Fellow on the WEF's Global Future Council on Energy, Scott advises the Forum on energy-related content. Scott was the architect of the Forum's Electricity and Energy Industries Transformation Maps. Prior to Form Energy, Scott was a consultant to Breakthrough Energy Ventures, the Director of Operations for Prime Coalition, the Managing Director for the MIT Clean Energy Prize, the Director of Engineering for Circular Energy, and an analyst with GTM Research. Scott holds a B.S. in Chemical Engineering with distinction from Washington University in St. Louis, an M.S. from MIT's Engineering Systems Division, and a Ph.D. from MIT's Institute for Data, Systems, and Society.



### **Kevin Dawson**

Kevin Dawson is Director, Market Design at the Alberta Electric System Operator (AESO) and has been with the organization since 2010. In this role, he is responsible for overseeing the development and implementation of AESO policies and market rules pertaining to the operation of Alberta's wholesale electricity market. Prior to joining the AESO, Mr. Dawson spent 12 years at TransAlta, holding progressively senior roles in the areas of market analysis, risk management, commercial and portfolio management and commodity hedging. Mr. Dawson holds a Bachelor of Arts Honours degree in Economics and a Master of Arts degree in Economics, both from the University of Calgary. In addition, he is a Chartered Financial Analyst charterholder.





### **Meredith Fowlie**

Meredith Fowlie holds the Class of 1935 Endowed Chair in Energy at UC Berkeley. She is an Associate Professor in the Agriculture and Resource Economics department, an affiliated faculty of the Energy and Resources Group, a research affiliate at the Energy Institute at Haas, and Research Associate at the National Bureau of Economic Research in the Energy and Environmental Economics group. Fowlie has worked extensively on the economics of energy markets and the environment. Her research investigates real-world applications of market-based environmental regulations, the economics of energy efficiency, the demand-side of energy markets, and energy use in emerging economies. Her work has appeared in *The American Economic Review*, the *Journal of Political Economy*, *The Review of Economics and Statistics*, and other academic journals. She received a PhD in Agricultural and Resource Economics from UC Berkeley in 2006, an M.Sc. from Cornell in 2000, and a B.Sc. from Cornell in 1997. Before joining the faculty at UC Berkeley she was an Assistant Professor of Economics and Public Policy at the University of Michigan.



### **A.J. Goulding**

In his role as president of London Economics International LLC, A.J. Goulding manages a growing international consulting firm focused on finance, economic, and strategic consulting to the energy and infrastructure industries. In addition to serving as a sector expert in electricity and gas markets, his responsibilities include project management, marketing, budget and financial control, and recruiting. A.J. also serves as an Adjunct Associate Professor at Columbia University, where he teaches a course on electricity market design and regulatory economics. In addition, he is a member of the Ontario Energy Board's Advisory Committee on Innovation.



### **Guy Holburn**

Guy Holburn is Professor of Business, Economics and Public Policy, and Suncor Chair in Energy Policy at the Ivey Business School. His areas of expertise are regulation, governance, and business strategy, with a focus on the energy and utilities sectors. Dr. Holburn is the founder and Director of the Ivey Energy Policy and Management Centre, which conducts applied research on energy sector policy in Canada. He is also a director of London Hydro, an advisory board member of the Canadian Network for Energy Policy Research and Analysis, and a member of the Council for Clean & Reliable Energy. Dr. Holburn has served as consultant to corporations and governments in Canada and the U.S., and has testified as an expert witness on regulation and corporate governance at the Muskrat Falls Inquiry and on business strategy in commercial litigation. He holds a Ph.D. and M.A. from the University of California, Berkeley, and a B.A. Hons. (First Class) from Cambridge University. Previously he worked for several years as a management consultant for Bain and Company in the U.K. and in South Africa.



### **Michael Lyle**

Michael Lyle is Vice President, Legal Resources and Corporate Governance at the IESO. He is responsible for legal services, support for the IESO's Board of Directors, contract management and the creation and maintenance of market rules. Mr. Lyle has extensive experience in the regulation of the electricity sector in Ontario. Previously, he was Vice President, Planning, Legal, Indigenous Relations and Regulatory Affairs at the IESO; and General Counsel and Vice President, Legal, Aboriginal and Regulatory Affairs at the Ontario Power Authority. Mr. Lyle has also served as counsel for the Ontario Energy Board and, before that, counsel at the Ministry of Energy. Mr. Lyle obtained his law degree from the University of Toronto and also holds a BA in economics from the University of Western Ontario.



### **Andrew Ott**

Andrew L. Ott formerly served as President and CEO of PJM Interconnection, the largest power grid in North America and the largest electricity market in the world. Mr. Ott was with PJM for 23 years and previously worked for GPU Service Corp for 14 years in Transmission planning and Operations. In addition to serving as PJM Chief Executive and Board member, he was responsible for design and implementation of the PJM wholesale electricity markets. He has extensive experience in power system engineering, transmission planning, applied mathematics, electricity market design and implementation. Mr. Ott is internationally recognized as an expert in electricity market design. He is an IEEE Fellow and an Honorary Member of CIGRE. Mr. Ott received a Bachelor of Science in electrical engineering from The Pennsylvania State University and a Master of Science in applied statistics from Villanova University.



### **Pierre-Olivier Pineau**

Pierre-Olivier Pineau (PhD, HEC Montreal, 2000) is a professor at the Department of Decision Sciences of HEC Montreal and holds the Chair in Energy Sector Management since 2013. He is an energy policy and management specialist, with a focus on electricity reforms. He has published many papers on the energy sector, most of them exploring the links between energy and some aspects of sustainable development. He participates regularly in the public debate on energy and has authored many reports for the government and other public organizations. He is a CIRANO Fellow, member of the CAEE, CIRODD and institute EDDEC. Before joining HEC Montreal, he was an associate professor at the School of Public Administration, University of Victoria (2001-2006).



### **Brian Rivard**

Brian Rivard is an Adjunct Professor at the Ivey Business School and Director of Research for the Ivey Energy Policy and Management Centre. His area of expertise and study is electricity market design and regulation. Brian has experience as an energy consultant, most recently as a Principal at Charles River Associates. He also worked for the Independent Electricity System Operator (IESO) as Director of Markets. For almost 15 years at IESO, he helped support the development of market-based approaches to managing Ontario's electricity system needs. In addition, Brian spent six years as a senior economist with the Canadian Competition Bureau. He has written articles for various publications such as the Energy Journal, Canadian Competition Record, Antitrust Law Journal, and the Journal of Economic Theory as well as chapters included in Competition Policy and Intellectual Property Rights in the Knowledge-Based Economy and Payments Systems in the Global Economy: Risks and Opportunities. He has also provided expert testimony before the US Federal Energy Regulatory Commission and the Ontario Energy Board. He received his MA and PhD in Economics from the University of Western Ontario.



### **Jessica Savage**

Jessica Savage is the Director of Corporate & Regulatory Affairs in the Policy, Engagement and Innovation business unit of Ontario's Independent Electricity System Operator (IESO). In this role, she is responsible for implementing and managing the IESO's relationship strategy with municipalities, customers, media, sector stakeholders and the public to ensure positive and productive partnerships. In her almost 15 years with the IESO, Jessica has held progressively senior roles within different parts of the organization, including market development, government and regulatory affairs, and operations. This included managing the market rule amendment process for the Renewables Integration Initiative and successfully leading IESO's fee applications for Ontario Energy Board approval. Her broad range of experience at the IESO means that she brings a customer-focused and

enterprise-wide perspective to each role she assumes. Jessica began her career with Ontario Power Generation, working in energy markets leading up to and during the opening of the province's electricity market. Jessica has a master's degree in economics from the University of Guelph.



### **Brandon Schaufele**

Brandon Schaufele was awarded a three-year Ivey Energy Consortium Fellowship in 2015. He is an Assistant Professor of Business, Economics, and Public Policy at the Ivey Business School. Prior to coming to Ivey in 2014, Schaufele was an Assistant Professor in the Department of Economics at the University of Ottawa, as well as Research Director of the university's Institute of the Environment. Having also served as the Research Director of Sustainable Prosperity, a leading Canadian think-tank on environment-economy issues, his research focuses on the links between firms, governments and civil society, with special emphasis on energy and environmental policy. Recent research has concentrated on how consumers and firms respond to major Canadian greenhouse gas emission reduction initiatives.



### **Ian Schneider**

Ian Schneider is a doctoral candidate at MIT's Institute for Data, Systems, and Society. He received M.S. degrees in Electrical Engineering and Computer Science and in Technology and Policy, both from MIT. He uses tools from optimization, network science, and game theory to improve market design for electric power systems, with a particular interest in improving power system flexibility to ease the incorporation of renewable energy. Ian won best paper at the 2018 Technology, Management and Policy Consortium for his work on demand competition in power systems with renewable energy. He was named a Future Energy Leader by IHS Markit at CERA Week 2018 and a Siebel Scholar. Ian has worked or consulted for Google's DeepMind, Borrego Solar, Argonne National Laboratory, and the U.S. Department of Energy's Advanced Research Projects Agency (ARPA-E).



### **Blake Shaffer**

Blake Shaffer is an adjunct professor of economics and public policy research fellow at the University of Calgary, as well as a fellow-in-residence at the C.D. Howe Institute. Dr. Shaffer has extensive experience in energy trading having worked in electricity, natural gas and emissions markets over a 15 year career. Dr. Shaffer has also served as a policy advisor on energy and environmental policy matters for the governments of Alberta, British Columbia, and Canada. He holds a PhD in economics from the University of Calgary, Master of Philosophy in economics from the University of Cambridge and a bachelor's degree in environmental science from Queen's University.



### **Sarah Simmons**

Sarah Simmons is the Manager of Generation and Emerging Sectors at Power Advisory LLC. Sarah has more than 10 years of professional experience in the electricity sector and has advised large-scale and distributed generators, the Independent Electricity System Operator, electricity distributors and transmitters, industrial load customers, technology providers, and industry associations. In her current role at Power Advisory, she leads on matters related to innovation and sector evolution, regulatory affairs and policy. Sarah has a Bachelors Degree in Environmental Science from the University of Guelph and a Master's Degree of Environmental Studies from the University of Waterloo.





### **Kathleen Spees**

Dr. Kathleen Spees is a Principal at The Brattle Group with expertise in wholesale electricity and environmental policy design and analysis. Her work for market operators, regulators, regulated utilities, and market participants focuses on: energy, capacity, and ancillary service market design; the design of carbon and environmental policies; valuation of traditional and emerging technology assets; and strategic planning in the face of industry disruption. Dr. Spees has worked in more than a dozen international jurisdictions supporting the design and enhancement of environmental policies and wholesale power markets in decarbonizing electricity systems. Dr. Spees has supported the IESO since 2014 in a number of market design efforts and modeling analyses of the Ontario electricity system. Dr. Spees earned her PhD in Engineering and Public Policy within the Carnegie Mellon Electricity Industry Center in 2008 and her MS in Electrical and Computer Engineering from Carnegie Mellon University in 2007. She earned her BS in Physics and Mechanical Engineering from Iowa State University in 2005.



### **Cheryl Terry**

Cheryl Terry is Principal Economist & Director, Corporate Economics at the AESO. Cheryl has extensive and diverse experience in the electricity industry, acting in many senior roles. Cheryl has spent the majority of her career with the Alberta Electric System Operator (AESO) and its predecessor organizations mainly in market design, policy and market strategy and most recently as the director of Corporate Economics. While at the AESO, Cheryl was co-chair of the Alberta Wholesale Market Policy Taskforce, initiated by the Alberta Department of Energy (in 2004-05) to consider market evolution options. As part of her career, Cheryl worked in industry in various roles ranging from acting as the Director of Market Services, Western Power Group for TransCanada responsible for regulatory and policy direction in western power markets and a number of years with SaskPower prior to coming to Alberta.



### **Ben Ullman**

Ben is the manager of Energy Markets at Opus One Solutions. He spent over four years at the Federal Energy Regulatory Commission as an Economist investigating allegations of market manipulation in power and gas. He left the FERC to join Navigant Economics as a Managing Consultant where he continued working on economic valuation in North American energy markets. He joined Opus One solutions to bring wholesale market concepts to the distribution system and works with Opus One's utility partners to develop and deploy transactive energy markets throughout the U.S., EU, and Canada.



### **Frank Wolak**

Frank A. Wolak is the Holbrook Working Professor of Commodity Price Studies in the Economics Department and Director of the Program on Energy and Sustainable Development at Stanford University. His current research and teaching focuses on design, performance, and monitoring of energy and environmental markets in the United States and globally. From April 1998 to April 2011, he was Chair of the Market Surveillance Committee of the California Independent System Operator. Wolak has worked on the design and regulatory oversight of the electricity markets internationally in Europe in England and Wales, Germany, Italy, the Netherlands, Norway and Sweden, and Spain; in Australia/Asia in New Zealand, Australia, Indonesia, Korea, Philippines, Singapore; in Latin American in Brazil, Chile, Colombia, El Salvador, Honduras, Peru, and Mexico; and the US in California, New York,

Texas, PJM, and New England. Wolak also has worked on the design of transmission planning, expansion, and pricing protocols to enhance wholesale electricity competition and support the expansion of renewable energy resources in the United States and in the Australia, Canada, Chile, Peru, and the United Kingdom. He was also a member of the Emissions Market Advisory Committee (EMAC) for California's Market for Greenhouse Gas Emissions allowances from January 2012 to December 2014. This committee advised the California Air Resources Board on the design and monitoring of the state's cap-and-trade market for Greenhouse Gas Emissions allowances.



*The Ivey Energy Policy and Management Centre gratefully acknowledges continued financial support from the Ivey Energy Consortium and Ted Kernaghan, HBA '65.*

**ATCO**

**Bruce Power™**

*Innovation at work*

hydro   
**one**

**Mr. Ted Kernaghan**  
**HBA '65**

**OMERS**

 **POWER  
WORKERS'  
UNION**

**SUNCOR** | SUNCOR  
ENERGY  
FOUNDATION

 **TC Energy**

*The Centre also thanks the following organizations for their financial support of this particular event:*

**aeso**  
ALBERTA  
ELECTRIC  
SYSTEM  
OPERATOR 

 **CAEE** Canadian Association for  
Energy Economics  
Association canadienne  
d'économique de l'énergie

 **ieso**

**LE**  
London  
Economics