

IVEY ENERGY POLICY AND MANAGEMENT CENTRE



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DIRECTOR'S MESSAGE



GUY HOLBURN, DIRECTOR | Ivey Energy Policy and Management Centre | Suncor Chair in Energy Policy Ivey Business School

I am pleased to report that 2016 has been another record year of activity for the Ivey Energy Policy and Management Centre. We continue to expand our contributions of fact-based, independent thought leadership to public discourse on major energy policy issues, with Ivey faculty publishing nine new Policy Briefs on core Centre topics – economic contribution and impact of the energy sector, industry regulation, and stakeholder engagement.

I encourage you to delve into the unique analyses and insights contained in these new publications, which explore the changing role of the oil and gas sector in the Canadian economy, the impact of oil price shocks on GDP, new emissions requirements for pipeline approvals, renewable energy investment, and consumer advocacy in the electricity sector.

Ivey has also continued to provide a trusted forum for multi-stakeholder conversations around energy policy development, organizing and supporting seven conferences, workshops, and expert panels over the last year. Highlights have included keynote addresses by Gaetan Caron, former Chair of the National Energy Board on 'Government, Regulators, and Energy Policy'; Richard Dicerni, former Deputy Minister, Alberta Executive Council, on 'Alberta's Shake-Up: Policies, Pipelines,

People'; Her Honour Elizabeth Dowdeswell, Lieutenant Governor of Ontario, on 'Building Local Community Confidence in Renewable Energy Development'; and Professor Stephen Littlechild, Cambridge University, on 'Electricity Privatization and Restructuring: Lessons from Abroad'. More than 400 leaders from industry, government, NGOs, Aboriginal groups, and academia, as well as students, came together at these events to discuss solution-oriented policies in today's increasingly complex energy sector.

I am thankful for the tremendous efforts of the whole Ivey Energy Policy and Management Centre team – faculty and staff, student interns, executive fellows, and advisory board members – all of whom are integral to the Centre's achievements.

I am also especially grateful for the support of our donors – ATCO, OMERS, Power Workers' Union, Suncor Energy Foundation, TransCanada Corporation, and Union Gas – who have enabled the Centre to grow and extend its impact. The Centre has ambitious plans to build on the past year's successes, and we look forward to working with all our partners in the coming year.

RESEARCH

ENERGY CENTRE POLICY BRIEFS ANALYSIS AND INSIGHT INTO ENERGY ISSUES



UP OR DOWN? TRENDS IN THE OIL & GAS SECTOR'S CONTRIBUTION TO THE CANADIAN ECONOMY

Effective policy-making in government and in the private sector relies on the availability of accurate statistical data, including on the economic growth trajectories of specific industries. In the absence of high quality data, decision-makers must make assumptions and estimates, which may prove inaccurate, leading to mistaken resource allocations. The importance of accurate, reliable, publicly available economic data increases with the magnitude of a sector's contribution to the economy.

This Policy Brief highlights ambiguities and apparent contradictions in government statistical data on the economic growth record of one of Canada's largest industry sectors, oil and gas extraction. Using publicly available data, the oil and gas sector's share of national GDP is estimated to have declined from 2002-2008 when using inflation-adjusted real GDP data, but instead to have increased when using nominal GDP data. Several potential explanations for the apparent contradiction are advanced, though the opaqueness of Statistics Canada's approach to calculating sector-level real GDP data makes it difficult to ascertain whether the observed divergence in real and nominal GDP contribution trends is genuine or else a statistical artifact. It thus remains a matter of speculation whether the oil and gas sector was an engine of superior economic growth during the 2000s or whether it under-performed the broader economy. For provincial and federal governments, whose budget forecasts and planning depend on oil and gas sector economic performance, uncertainty about future growth trajectories in the sector is particularly challenging. After attempting to reconcile several data series on oil and gas sector contributions to gross domestic product, the Policy Brief argues for improvements in the transparency and accessibility of key statistical data, and for the creation of a dedicated agency akin to the Energy Information Administration in the U.S.



AN ECONOMIC ANALYSIS OF NEW UPSTREAM EMISSIONS REQUIREMENTS FOR PIPELINE APPROVALS

New regulations announced by the federal government require the National Energy Board to consider the quantity of direct and upstream greenhouse gas emissions when evaluating pipeline projects, but estimates of the emissions attributable to a given project are highly uncertain. Uncertainty introduces important policy implications when trading-off quantity- and price-based greenhouse gas policies. This trade-off depends on comparing the benefits from extracting and consuming oil to the global harm caused by emissions. This Policy Brief argues that, due to the inherent uncertainty, carbon taxes – and not emissions quantity limits on pipeline projects – are the best instrument to control overall sector emissions and to achieve both economic and environmental goals.

ENERGY IN CANADA: A STATISTICAL OVERVIEW

It is well known that energy industries are major contributors to Canada's economy. Today Canada is one of the world's leading energy economies and is forecast to remain one of the primary sources of growth in global energy supply. However, the extent to which energy alone affects Canada's economic prosperity is less broadly recognized. This Policy Brief compiles key statistical facts about the contribution of Canada's energy sector to the national economy using a variety of macroeconomic metrics such as gross domestic product, employment, capital expenditures, and exports.



DEVELOPING UNCERTAINTY: RENEWABLE ENERGY POLICY AND WIND GENERATION IN ONTARIO

Wind generation has grown rapidly to become a significant contributor to Ontario's electricity sector over the past decade, with six per cent of total generation production and 10 per cent of installed energy capacity in 2015. This Policy Brief explores whether Ontario's 2009 Green Energy and Green Economy Act has had a measurable impact on the length of the regulatory approval process. Analysis of data collected on commercial wind generation projects suggests that, despite a stated goal of streamlining renewable energy development, the implementation of the 2009 Act has been a source of uncertainty for project proponents and has not substantially reduced development timelines.



THE IMPACT OF OIL PRICE SHOCKS ON CANADIAN NATIONAL AND PROVINCIAL GDP

Since 2000, Canada's economy has become increasingly dependent on the energy sector for growth. Oil prices have declined in recent years, however. This Policy Brief presents new quantitative estimates of the effect of lower resource prices on Canadian GDP and provincial household incomes as well as for the excess volatility of provincial output. The results identify the important role of the energy and resource sectors within national and inter-provincial policy discussions, and aid provincial policy-makers and managers as they grapple with current and future changes in energy markets.

CONSUMER ADVOCACY IN ONTARIO'S ENERGY SECTOR

Recent legislation requires the Ontario Energy Board to establish a new process to represent the interests of utility consumers in its proceedings. This Policy Brief discusses the model of consumer representation in the U.S., where independent public consumer advocates operate in most states, with mandates and resources to represent residential and other consumers in regulatory proceedings. The results of academic research are presented, demonstrating that utility regulators in U.S. states with public consumer advocates tend to establish lower residential rates relative to other consumer classes and lower allowed returns-on-equity for utilities.



IN PARTNERSHIP WITH THE LAWRENCE CENTRE



SQUARING THE CIRCLE: CANADIAN GHG EMISSIONS

This article explores the structure of federal-provincial collaboration needed to square the circle of meeting Canada's 2030 greenhouse gas emissions target.



SHARING THE BURDEN: CANADIAN GHG EMISSIONS

This brief highlights the rationale for three alternative approaches to greenhouse gas emission burden sharing: egalitarian, historical, and efficiency.



BY THE NUMBERS: CANADIAN GHG EMISSIONS

Taking a look at Canada's current greenhouse gas emissions in comparison to global rates, this article forecasts the necessary reduction rates for the future.

BY THE NUMBERS, 2012-2016

\$1.7 million

Donations

15 Student internships granted

31

Events

16

Student scholarships awarded

2,250

Ivey alumni in the energy sector

\$3.4 MILLION

Research grants and awards

2,700

Attendees at events

26 Publications

FACULTY RESEARCH GRANTS AND AWARDS

Matt Davison

- NSERC Discovery grant, \$235,000, Principal Investigator, 2015-2019

Adam Fremeth

- Social Sciences and Humanities Research Council grant, \$132,666, Principal Investigator, 2014-2018
- Social Sciences and Humanities Research Council grant, \$68,100, Principal Investigator, 2011-2014
- Carbon Management Canada grant, \$442,140, Principal Investigator, 2011-2014

Horia Hangan

- Infrastructure Operational Fund CFI and ORF, \$3,635,891, Principal Investigator, 2014-2019
- NSERC CRD grant, \$540,000, Principal Investigator, 2015-2018
- NSERC Discovery grant, \$110,000, Collaborator, 2012-2017

Guy Holburn

- Natural Resources Canada grant, \$30,000, Principal Investigator, 2015-2016
- Social Sciences and Humanities Research Council grant, \$62,000, Principal Investigator, 2010-2013
- Hydro One University of Western Ontario Research grant, \$150,000, Principal Investigator, 2010-2012

Margaret Loudermilk

- Mitacs Accelerate grant, \$30,000, Principle Investigator, 2016

Brandon Schaufele

- Sustainable Prosperity Research grant, \$13,200, Principal Investigator, 2013
- University of Ottawa CUT grant, \$6,863, Principal Investigator, 2012-2013
- Pacific Institute for Climate Science, \$10,000, Co-Principal Investigator, 2012-2014
- Environment Canada Economics and Policy Research Network, \$500,000, Collaborator, 2012-2017
- CIGI-INET Research grant, \$198,000, Collaborator, 2012-2014

TEACHING

TRANSCANADA'S KEYSTONE XL PIPELINE: UNFINISHED BUSINESS

Visiting Fellow, Dennis McConaghy, is the lead author on a new teaching case study for use in Ivey courses. In 2008, the Keystone XL pipeline project was seen by executives of TransCanada Corporation as a readily achievable, financially significant and strategically compelling venture that would create a 2,735-kilometre route for Canadian crude from the Alberta oil sands to refineries in Oklahoma and the Gulf coast.

Instead, by 2015 it had become an example of the extended financial and reputational risks that can arise from external political, regulatory and stakeholder reactions in hotly contested settings.

The case study explores fundamental questions regarding how the project was originally justified and how seemingly reasonable tactical decisions by the firm became enmeshed in broader societal and political conflicts around energy sector development and environmental policy. The case study draws out lessons for how firms can execute major infrastructure projects and manage stakeholder relations to reduce investment risks.



Western University Professors Gordon McBean and Radoslav Dimitrov

THE MAKING OF CLIMATE SCIENCE AND POLICY: AN INSIDER PERSPECTIVE

Expert panelists and Western University Professors Gordon McBean and Radoslav Dimitrov shared their perspectives from working inside the 2015 Paris Climate Change Meetings and UN climate policy institutions.

FINDING A WAY FORWARD FOR PIPELINE DEVELOPMENT IN CANADA

The HBA Energy and Resources Club and the Ivey Energy Policy and Management Centre hosted a panel event and Q&A with Francois Poirier, President, Energy East Pipeline, TransCanada; and Bruce Lourie, President, Ivey Foundation.



Francois Poirier

INTERNS PLUG IN TO THE ISSUES FACING THE ENERGY SECTOR

Energy Centre interns gain first-hand knowledge of the issues and challenges facing the energy sector through working with Centre faculty on research projects.



FAYE ZHOU

"While interning with the Energy Centre, I worked mainly on studying the factors that affect utility commission decisions – it was an entirely new field for me. It's been very exciting to break into a new field and have the opportunity to explore the depths of the energy sector.

The learning and research approach has been very beneficial for me... the internship strongly improved my soft skills, such as time management and multitasking. Meanwhile, I've been able to apply the new knowledge I've learned in Excel VBA when managing and analyzing data."

ANALYST INTERN, Greystone Managed Investments Inc.



TIANJIAO XU

"As a PhD student and a junior researcher in the area of Business, Economics and Public Policy, I found my experience working with the Ivey Energy Centre extremely rewarding. The most beneficial part is that I get to work on a policy paper which is more practically oriented than academic papers that I usually develop.

Moreover, I get to talk to industry experts who were directly involved in the decision-making process of firm-level strategies and learn about practical implications of policy design in depth. This opportunity has had a positive impact on my educational experience as I learned more about data collection and manipulation, which is crucial to my education and future career in academia."

PHD CANDIDATE, Business, Economics and Public Policy

SUNCOR AWARD RECOGNIZES IVEY'S RISING STARS



SEELA Award recipients Carl Botha, Benjamin MacNicol, Connor Barr, and Mikaela Ferguson – not pictured

The Suncor Energy Foundation has established the Suncor Energy Emerging Leaders Awards (SEELA), honouring selected first-year HBA students who demonstrate excellent academic achievement, strong leadership and a keen interest in the energy sector.

The award provides these students with financial support, mentorship from faculty in the Centre and the opportunity to combine energy sector knowledge with business education to help them become leaders in the industry.

CARL BOTHA

Program: Dual HBA/Green Process Engineering

Area of Interest: Energy and Renewable Power Industries

"I applied for the award because of my passion for the energy industry, and for the possibility to make a connection with a company that will become more involved in green engineering in the future. The award positively impacted my life by allowing me to open the door at Suncor, where I worked this past summer. Because of the scholarship, I was able to meet the VP I would later work under, which made me more comfortable networking over the summer within Suncor."

Fun Fact: Carl speaks Afrikaans, and has a basic understanding of Mandarin.

OUTREACH



Her Honour Elizabeth Dowdeswell, Lieutenant Governor of Ontario

← BUILDING LOCAL COMMUNITY CONFIDENCE IN RENEWABLE ENERGY DEVELOPMENT



September 23, 2016

The Honourable Elizabeth Dowdeswell, Lieutenant Governor of Ontario, joined by Ken Hewitt, Mayor, Haldimand County; Margaret Loudermilk, Research Director, Ivey Energy Policy and Management Centre, Ivey Business School; Michael Lyle, Vice President, Planning, Law and Aboriginal Relations, IESO; and Kris Smith, Executive Vice President, Downstream, Suncor, discussed issues surrounding renewable energy development at a local level.

ALBERTA'S SHAKE UP: POLICIES, PIPELINES, AND PEOPLE →



September 14, 2016

Richard Dicerni, former Deputy Minister to Premier Notley during her first year in office, as well as former Deputy Minister of Industry Canada, spoke to Ivey faculty, staff, and students about Alberta's government changes, climate change policy, pipeline challenges, and the fiscal and economic environment.



Richard Dicerni

FOURTH ANNUAL ENERGY LEADERS ROUNDTABLE



April 13, 2016

The Ivey Energy Policy and Management Centre partnered with the Council for Clean and Reliable Electricity, and the University of Waterloo, to help organize the Fourth Annual CCRE Energy Leaders Roundtable in Orangeville, Ontario. Keynote speakers included Annette Verschuren, Chair and CEO of NRSor Inc. as well as Chair of the Clean Energy Task Force for Ontario; and Gaetan Caron, former Chair and CEO of the National Energy Board of Canada.



Bob Hamilton, Deputy Minister of Natural Resources Canada with Energy Centre faculty Brandon Schaufele, Adam Fremeth, Margaret Loudermilk and Paul Boothe of the Lawrence Centre.

↑ FORUM WITH BOB HAMILTON



March 14, 2016

Bob Hamilton, Deputy Minister of Natural Resources Canada, visited the Ivey Energy Policy and Management Centre to discuss research and the new ministerial mandate. Centre faculty shared findings from current research initiatives and explored opportunities for collaboration with NRCan researchers. Hamilton's visit was part of a trip to Western University to discuss how NRCan fosters a competitive Canadian energy sector.



Professor Stephen Littlechild

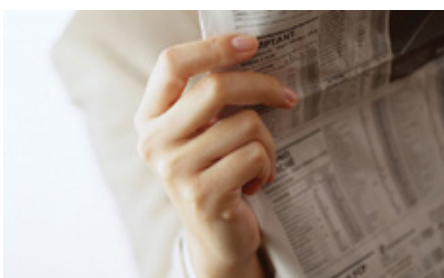
↑ ELECTRICITY PRIVATIZATION AND RESTRUCTURING



November 30, 2015

The Energy Centre hosted two expert panel events on the topic of electricity privatization and restructuring, with special keynote speaker Professor Stephen Littlechild, Emeritus Professor, University of Birmingham, and Fellow, Judge Business School, University of Cambridge. Additional speakers included: Jan Carr, former CEO of the Ontario Power Authority; David Hay, former CEO of New Brunswick Power; Dwight Duncan, former Deputy Premier and Minister of Energy, Government of Ontario; John McManus, Senior Advisor, Borealis.

READ MORE ABOUT THE EVENT AT GO.IVEY.CA/PRIVATIZATION



MEDIA MENTIONS

Ivey Energy Centre faculty received significant media attention this year. They shared their insights with news outlets such as CTV News, CBC News, Maclean's, and iPolitics on issues ranging from carbon pricing, to pipelines, to climate change.

READ THE FULL ARTICLES AT IVEY.CA/ENERGYCENTRE/NEWS

IVEY ENERGY POLICY AND MANAGEMENT CENTRE FACULTY AND STAFF



GUY HOLBURN, DIRECTOR

Guy Holburn is the Suncor Chair in Energy Policy and an Associate Professor of Business, Economics and Public Policy at the Ivey Business School. His area of expertise is in the intersection of business strategy and public policy, particularly as applied to strategy and policy issues in the energy and utilities sectors. He is currently leading a multi-year research program on the regulation of the energy sector in Canada. Holburn received his MA and PhD from the University of California, Berkeley, and his BA Hons. (First Class) from Cambridge University. He is a member of the Council for Clean and Reliable Electricity.

ADAM FREMETH, IVEY ENERGY CONSORTIUM FELLOWSHIP

Adam Fremeth joined the Ivey Business School as an Assistant Professor of Business, Economics and Public Policy in 2009 after completing his PhD in Strategic Management and Organization at the University of Minnesota. He holds an HBA from Ivey and an MA in International Affairs from Carleton University. His research focuses on the intersection of firm strategy and public policy-making.

MARGARET LOUDERMILK, RESEARCH DIRECTOR

Margaret Loudermilk joined the Ivey Energy Policy and Management Centre as Research Director in 2014 and is an Adjunct Research Professor in the Business, Economics and Public Policy group at Ivey. Her research focuses on measuring the economic impacts of energy policies. She is now leading major research projects for the Energy Centre on social licence in the energy sector, and on aboriginal participation in energy projects. Loudermilk received her PhD in Economics from Michigan State University, specializing in econometrics and industrial organization.

BRANDON SCHAUFELE, IVEY ENERGY CONSORTIUM FELLOWSHIP

Brandon Schaufele is an Assistant Professor in Business, Economics and Public Policy at the Ivey Business School. Prior to his arrival in 2014, Schaufele was an Assistant Professor in the Department of Economics at the University of Ottawa, as well as the Research Director of the University of Ottawa's Institute of the Environment. Schaufele's research focuses on the links between firms, governments and civil society with special emphasis on energy and environmental policy.

JESSYCA WEMYSS, COORDINATOR

Jessyca Wemyss joined Ivey Business School in 2015 as the Coordinator for the Ivey Energy Policy and Management Centre. Previously, Wemyss has worked in the digital marketing industry, specializing in content, social media, and optimization tactics. She has a BA and a Postgraduate Diploma from Western University.

PAUL BOOTHE, RESEARCH FELLOW

Paul Boothe was Professor and Director of the Lawrence National Centre for Policy and Management at the Ivey Business School from 2012 to 2016. Boothe's public sector career includes serving as the Deputy Minister of Finance and Secretary to Treasury Board for Saskatchewan (1999-2001), Associate Deputy Minister of Finance and G7 Deputy for Canada (2004-2005), Senior Associate Deputy Minister of Industry (2007-2010) and Deputy Minister of the Environment (2010-2012).

MATT DAVISON, RESEARCH FELLOW

Matt Davison is a full Professor jointly appointed to the departments of Applied Mathematics and Statistical & Actuarial Sciences at Western University. Davison holds the Canada Research Chair in Quantitative Finance and leads the nationwide Modelling Trading and Risk in the Market project for the MITACS Network of Centres of Excellence. Much of his research is on energy markets and finance, and lies at the intersection of industrial mathematics, operational research, and engineering.

HORIA HANGAN, RESEARCH FELLOW

Horia Hangan is a Professor in the Faculty of Engineering at Western University and the Founding Director of the Wind Engineering, Energy and Environment (WindEEE) Research Institute. His research focuses on the simulation and impact of high intensity winds, wind energy and wind environmental impacts.

RICHARD DICERNI, RESEARCH FELLOW

Richard Dicerni was Deputy Minister of Alberta Executive Council from 2014-2016. He held the position of Deputy Minister of Industry Canada from 2006 to 2012. He began a career with the federal government in 1969 and has held a number of executive positions in the federal and provincial public service.

GORD LAMBERT, SUNCOR SUSTAINABILITY EXECUTIVE-IN-RESIDENCE

Gord Lambert is the former Executive Advisor of Sustainability and Innovation at Suncor Energy. Previously, he was Vice President of Sustainable Development. Prior to assuming that role in 1997, Lambert spent two years as Director of Sustainable Development for TransAlta Corporation and 15 years with a major Canadian integrated oil and gas company. In 2015, he was appointed Suncor Sustainability Executive-in-Residence at Ivey, where he works with both the Ivey Energy Policy and Management Centre and Ivey's Centre for Building Sustainable Value.

DENNIS MCCONAGHY, VISITING FELLOW

Dennis McConaghy is the former Executive Vice-President of Corporate Development at TransCanada. Previously, he was Executive Vice-President of Pipeline Strategy and Development. He joined TransCanada in 1998, and has held senior positions in Corporate Strategy & Development, Midstream/Divestments, and Business Development. He has more than 25 years experience in oil and gas. In 2014, he was appointed Visiting Fellow for both the Ivey Energy Policy and Management Centre and Ivey's Lawrence National Centre for Policy and Management.

RAJIV VARMA, RESEARCH FELLOW

Rajiv K. Varma is an Associate Professor and Hydro One Chair in Power Systems Engineering in the Electrical and Computer Engineering Department at Western University. Varma is the project lead in a recently awarded \$6-million research grant from Ontario Centre of Excellence for a photovoltaic solar power integration.



IVEY ENERGY POLICY AND MANAGEMENT CENTRE ADVISORY BOARD

WELCOME NEW BOARD MEMBERS

The Ivey Energy Policy and Management Centre is delighted to be welcoming two new members to the Advisory Board: **Eric Axford**, Executive Vice President, Business Services at Suncor; and **Wayne Stensby**, Managing Director, Electricity at ATCO.

STEVE BAKER	President, Union Gas Limited
PAUL BOOTHE	Professor and Director, Lawrence National Centre for Policy and Management, Ivey Business School
JAN CARR	Strategic Advisor, Gowlings and Hatch; Former CEO, Ontario Power Authority
RICHARD DICERNI	Deputy Minister of Alberta Executive Council
GUY HOLBURN	Director, Ivey Energy Policy and Management Centre, Ivey Business School
ROBERT KENNEDY	Dean, Ivey Business School
SIEGFRIED KIEFER	President and Chief Operating Officer, Power & Utilities, ATCO Ltd. & Canadian Utilities Limited
GORDON LAMBERT	Suncor Sustainability Executive-in-Residence, Ivey Business School
DON MACKINNON	President, Power Workers' Union
JOHN MCMANUS	Senior Advisor, Borealis Infrastructure
FRANCOIS POIRIER	Senior Vice President, Strategy and Corporate Development, TransCanada
E. LOUISE SPENCER	Director, Development, Ivey Business School

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