

Workshop

Economic Challenges for Energy

Madrid, 19-20 January 2015

Monday, 19 January

- 09.30 - 10.00 Welcome coffee and introduction
- 10.00 - 2.00 **Long-term energy prospective**
Pedro Linares, EfE and Comillas U.
Jean Michel Glachant, EUI
- 12.00 - 12.30 Coffee break
- 12.30 - 14.30 **Innovation in energy**
Lynne Kiesling, Northwestern U.
Elena Bou, KIC-Innoenergy
- 14.30 - 15.30 Lunch
- 15.30 - 17.30 **Energy security**
Amy Jaffe, U.C. Davis
Fabio Genoese, CEPS Fabio Genoese
- 17.30 - 18.00 Coffee break
- 18.00 - 19.30 **Open Session: Energy reform in Mexico**
Guillermo Zúñiga, Comisión Reguladora de Energía, Gobierno de México
- 21.00 Workshop Dinner

Tuesday, 20 January

- 10.00 - 12.00 **Energy and climate policies**
Juan Pablo Montero, Pontificia Univesidad Católica de Chile
Gerardo Bazán, ON Partners Mexico
- 12.00 - 12.30 Coffee break
- 12.30 - 14.30 **Energy demand and energy efficiency**
Pablo Arocena, U. Pública de Navarra
Louis-Gaëtan Giraudet, CIRED

The economic impact of climate-induced regional water constraints in the energy sector |

Pedro Linares

There is an increasing concern in the energy sector about how to confront its growing water demand, in a global setting in which water is expected to become a scarcer good. Indeed, the increase in energy demand will require more water for cooling power plants, for growing biofuels, or for extracting and refining fuels. On the other hand, the intensive use of fossil fuels for energy contributes significantly to a climate change that will reduce in some countries water inflows and in most of them will make them more irregular, thus increasing the risk of water stress. Also, the increasing demand for water will also require a significant amount of energy. The complexity of what is termed water-energy nexus, mediated by climate change, requires an integrated analysis of these two sectors both at global and regional levels. This has already been acknowledged by the International Energy Agency or by the United Nations. In this talk I will review both methodological approaches and case studies that have touched upon the water-energy nexus in different parts of the world, and will also show some results for Spain.

The EU energy policy questioned (today) in a long term perspective |

Jean-Michel Glachant

Since 2004-07 the EU did build something being quite properly termed a “European energy policy”. Many wonder today if it will stay alive or not and how it could evolve. I will address this issue into five steps. 1°- Is our EU power market able to adapt to existing EU policy changes? 2°- Is our EU gas market robust enough to external shocks? 3°- Are our new EU 2030 targets to destroy our former 2020 policy? 4°- Do we have a European governance able to make the new 2030 targets working at the EU level? 5°- Will EU ever manage its daunting external energy affairs challenges?

Innovation in energy |

Lynne Kiesling

What was once a staid and stable industry is increasingly facing changes to its economic environment, its technology space, and even its customers. Although regulation in the electricity industry over the past century has dulled endogenous change, ubiquitous changes outside the industry are challenging the existing physical network configuration and investments, the business model, and the regulatory model. These three dimensions of the industry are intertwined. As a regulated industry for over a century, the persistent business model is a regulatory construct, a consequence of organizational path dependence in the face of cost-recovery-based economic regulation. That regulatory theory and practice is grounded in a static theory of competition ill-suited to yielding insights into regulation and dynamism. I analyze regulatory institutions using a more dynamic theory of competition grounded in experimentation and emergent social learning, and use that theory in conjunction with other recent research to propose an alternative regulatory and utility framework. Emphasizing experimentation and the role that social institutions (including regulation) play in the process of technological change provides a new analysis of innovation processes in a capital-intensive, historically-regulated infrastructure industry, focusing on facilitating innovation while also aligning economic and environmental objectives.

Innovation in energy |

Elena Bou

Innovation in energy is no longer an individual game. Innovation in energy is systemic and this implies the need of involving all the key actors of the energy value chain and taking advantage of complementary competences from industry, education and research. These are key ingredients that lead to collaborative innovation partnerships and disruptive innovation. KIC InnoEnergy is a European company founded in 2010 by 27 shareholders from industry, education and research, under the umbrella of the European Institute of Innovation and Technology (EIT), to foster innovation and entrepreneurship in the field of sustainable energy. Operating in eight countries, this company offers an example of how collaboration between industry, universities and research centers can lead to new ways of managing innovation and launching disruptive products onto the market. However, designing and managing this type of network organization is not exempt of complexity and traditional management theories are usually challenged. It is an open environment, with high level of diversity and where different interests and motivations should be aligned to achieve objectives.

Energy security |

Amy Jaffe

After decades of dwindling energy supply and rising oil and gas demand, the United States finds itself in a new strategic position. Three decades of policies designed to curb oil demand and growth in transportation fuel use are finally paying off, and US oil demand is expected to decline by more than 20 to 30% in the next twenty years. But the dwindling demand outlook is only part of the US energy equation. Technological innovation and new investment strategies are promoting rapid development of new domestic energy supply sources in the United States. These sources include a renaissance in US domestic oil and gas production that is raising the prospect that the United States may be able to achieve a self-sufficient supply demand balance in the coming years. In

fact, the significant rise in domestic oil and gas production has opened the way for the United States to become a major oil and gas exporter, with large geopolitical and economic implications for global energy security and market transparency. Moreover, the dramatic rise in US energy production is not limited to oil and gas but also extends to renewable energy. The United States has in effect hit the jackpot on both fossil fuels and clean tech simultaneously, leaving it in an enviable position as the economy where cheap and ample energy supply is driving economic growth and wealth creation. The changed U.S. energy situation will have significant implications for global energy security and energy trade flows. To date, rising oil and gas production in the United States has created a market surplus and lowered global oil and gas prices by 30%, even in the face of relatively high volumes of disrupted oil supply flows from the Middle East and elsewhere. US production has enhanced global energy security so far by displacement, allowing spot LNG and oil supplies to be reallocated away from the US to markets threatened by ongoing disruptions to supply. Looking forward, US energy exports could play a key role in limiting oil and gas producers from exercising monopoly power in energy trade and to create more transparent and flexible global pricing regimes. The flow of oil and gas exports into markets in Europe and Asia will also have geopolitical consequences. This presentation will consider various scenarios for global energy markets in light of the new US energy situation and how they will influence energy security. Consideration will be given to the prospects for future oil supply disruptions from the Middle East, the future role of OPEC, Russian energy and new and emerging US and Chinese energy policy strategies.

Energy security | *Fabio Genoese*

In light of the 2014 Ukraine crisis, energy security has been put (once again) high on the EU agenda. This led to adopting the so-called European Energy Security Strategy, which inter alia identifies priority infrastructure projects, and to the appointment of a dedicated Commission Vice-President for Energy Union, effectively linking the climate change and internal market agendas to energy security. Yet, critics argue that this Energy Union remains a bureaucratic attempt of the Commission to repackage an increasingly ailing EU energy policy. Focusing on natural gas and electricity, we identify a number of means that could avoid such a development and help increasing EU energy security: (1) Increase attractiveness for new foreign gas suppliers by offering security of demand, (2) Match the power of single sellers with a higher buyers' power by jointly purchasing gas, (3) Support the build-up of new electricity infrastructure (interconnectors) through regional initiatives.

Energy and climate policies | *Juan Pablo Montero*

As part of a much broader tax reform, Chile's Parliament has recently passed legislation that establishes a carbon tax of 5 US\$ per ton of CO₂ affecting all power plants of 50 MW and above and large industrial facilities of similar size. Together these sources are responsible for about 55% of the country's CO₂ emissions. Despite the effect of the tax is not that large in terms of emissions reduction and electricity price increases (10% and 2%, respectively, by 2030), it is a crucial first step towards building the institutional capabilities the country will require in the future as we engage in more ambitious reduction goals including the transition to a broader cap-and-trade system that can be eventually linked to existing cap-and-trade systems. We discuss (i) the political economy of this carbon tax legislation as oppose to cap-and-trade; (ii) the prospects of extending the coverage to sectors not currently affected by the tax, namely transportation and forestry; (iii) its implications for future negotiations, particularly, for Paris 2015; and (iv) what is required to move forward and be able to link these mitigation efforts to international efforts.

2015: Challenges in the Mexican energy industry | *Gerardo Bazán*

During the last two years Mexico is undergoing a deep transformation of key components that affect its economy. One of the most important transformations is its energy sector. The recently approved energy reform not only allows private investment in all the energy value chain, but also establishes the mechanisms to allow that these investments contribute to the development and economic growth. Nevertheless, the implementation of such an ambitious reform implies risks and uncertainties. In this presentation I will discuss uncertainties and risk in the Mexican energy industry and I will focus on some ideas that might contribute to diminish these issues.

The impact of increased efficiency in the use of energy: a computable general equilibrium analysis for Spain | *Pablo Arocena*

The improvement of energy efficiency is one of the pillars of the energy policies in most countries, and constitutes one of the cornerstones of the European Union's 2020 strategy. Environmental considerations are not the only force pushing towards more efficient use of energy. In many advanced economies there is widespread concern about energy dependence, while the dramatic increase of energy prices over the last decade has led energy costs to occupy a prominent place in the debate on the drivers of industrial competitiveness. However, the expected energy

savings resulting from the improvement in the efficiency in the use of energy may not correspond to actual energy savings, because of the so-called rebound effect. That is, the possibility that improving energy efficiency could lead to reductions in energy consumption lower than expected, or even increases in consumption. Further, the increase of energy efficiency may also have further effects on economic growth and employment. We discuss these issues and analyze the economy-wide effects of an increase of energy efficiency in the Spanish economy by means of a computable general equilibrium model. We provide estimates of the rebound effect across sectors and energy types.

The energy efficiency gap: sources, magnitude and policy implications | *Louis-Gaëtan Giraudet*

For three decades, economists have sought to understand whether and why people invest too little in energy efficiency, a phenomenon known as the energy efficiency gap. The presentation will offer a critical review of the achievements and perspectives of this research agenda. First, we will see that energy-related decisions seem to be increasingly favored to test the insights from the emerging field of behavioral economics. As a result, explanations of the energy efficiency gap have focused on irrational undervaluation of energy efficiency by consumers. In contrast, more traditional market failures and informational problems at the interface between the demand and supply sides, though plausible sources of an energy efficiency gap, have been little examined. Second, we will see that for those sources that have been carefully examined, the gap is generally found to be small. Yet the claim is often based on energy savings assessment, which is not the most relevant metric of well-being. Moreover, little is known about the interactions between different sources of the energy efficiency gap. Third, we will see that the unresolved issues about the sources of the energy efficiency gap raise important policy questions. How do multiple policy instruments interact when multiple sources of the energy efficiency gap coexist? In particular, how do ‘nudges’ aimed at addressing behavioral limitations interact with more traditional government interventions?

Guillermo Zúñiga

Dr. Zúñiga works in the field of law and energy regulation. He has got a Master degree in Economic Regulation by the London School of Economics and a Master of Law in the University of Chicago Law School. He is a Law graduate of Instituto Autónomo Tecnológico de México (ITAM). He was designated as member of the Energy Regulatory Commission for a period of five years by President Enrique Peña Nieto, and ratified by the Mexican Senate. Mr. Zúñiga has got over fourteen years experience in the public sector, in areas of regulation, competition and energy. He has worked as a lawyer for the Management of Investment Projects Financed by the Federal Electricity Commission, Deputy Director of Regulated Sectors of the Federal Competition Commission (CFC), Legal Counsel of New Business Models in PEMEX Exploration and Production. He has also served as Legal Director of Operations of the Ministry of Petroleum and Energy and as Deputy General Manager of Regulatory Analysis of the Federal Competition Commission. He has also carried out academic activities, teaching Government Contracts, Economic Analysis of Law and Law of Energy at ITAM; Constitutional Theory at the Universidad Anahuac Del Sur; and public policies of regulation in graduate school in Public Administration from Tecnológico de Monterrey. He has written several articles on energy law journals. He is currently Young Professional Member at the Institute for Energy Law of the United States.

Pedro Linares

Dr. Linares is Professor of Industrial Engineering at the ICAI School of Engineering and co-founder and Director of Economics for Energy. He is also research affiliate at the Institute for Technology Research (IIT) and the BP Chair on Energy and Sustainability, and Research Associate at the Harvard Kennedy School, and MIT-CEEPR. He currently serves as Vice-Rector for Research and International Affairs at Comillas Pontifical University, Madrid. He holds a M.S. and Ph.D. in Agricultural Economics from U. Politécnica, Madrid. His research focuses on the relationship between energy, economics and environment, and specifically on sustainable energy, renewable energy and environmental policy, and multicriteria methods applied to resource allocation. He has published about these issues in most journals relevant in the field. He has also been a consultant for several private and public institutions in Spain, Europe and Latin America.

Jean Michel Glachant

Dr. Glachant is Director of the Florence School of Regulation at the European University Institute, Florence (Italy). He is Professor in Economics and holds a PhD from La Sorbonne University. He is or has been Advisor at the European Commission (DG TREN, DG COMP, DG Research and DG ENER) of and Coordinator/Scientific Advisor

of several European research projects like: Towards 2030, THINK, SESSA, CESSA, Optimate, EU-DEEP, RefGov, Reliance, TradeWind, Secure. He is Research Partner of CEEPR, (MIT, USA) and EPRG (Cambridge University, UK). Chief-Editor of EEEP: ("Economics of Energy & Environmental Policy") and member of the Council of the International Association for Energy Economics. He is also in the editorial board of Competition and Regulation in Network Industries, European Energy Journal, Latin-American Economic Review, Annals of Public and Cooperative Economics, Revue d'Economie Industrielle. Jean-Michel is Member of the "EU-Russia Gas Advisory Council" of European Energy Commissioner Oettinger. Last books are: "*Manufacturing the Markets*" (Cambridge University Press 2014); "*Building Competitive Gas Markets in the EU*" (Edward Elgard 2013). In Chinese: "*The Economics of Contracts - Theories and Applications*" (China Renmin University Press 2010).

Lynne Kiesling

Dr. Kiesling is an Associate Professor of Instruction in Economics at Northwestern University. At Northwestern she is also a Faculty Affiliate in the Searle Center on Law, Regulation, and Economic Growth, a Faculty Member in the Northwestern Institute on Complex Systems (NICO), and a Faculty Affiliate in the Center for the Study of Industrial Organization (CSIO). Her research focuses on the effect of regulatory institutions and their incentives on innovation and technological change, particularly in the electric power industry. Her specialization is industrial organization, regulatory policy and market design in the electricity industry. In particular, she examines the interaction of market design and innovation in the development of retail markets, products and services and the economics of "smart grid" technologies. She teaches classes in microeconomics, technological change, environmental economics, antitrust and regulation, environmental economics, and history of economic thought, and all of these topics and themes inform her research and other writing. She also writes about economics as the editor/owner of the web site Knowledge Problem.

Elena Bou

Dr. Bou is the Innovation Director of KIC InnoEnergy, a European company founded in 2010 under the umbrella of the European Institute of Innovation and Technology (EIT), to foster innovation and entrepreneurship in the field of sustainable energy and operating in eight European countries. Before becoming part of the executive board of KIC InnoEnergy, she was member of the founder team of this company. Prior to that, she developed her professional career in the field of management consulting in both private and public companies, nationally and internationally, giving her the opportunity to manage and develop many European Multinational Projects involving a high degree of complexity and stakeholders and including the creation of two spin-offs. Elena is also Professor of ESADE Business School since 1998. Former Director of the Executive Master of Operations and Services and cofounder and former director of the GRACO Research Group (IIK) at ESADE. Consultant and researcher in the field of knowledge and Innovation Management and author of several publications. Elena Bou holds a PhD in Management Sciences from ESADE-URL (Doctor Europeus) and has a degree in Business Administration and Management and an MBA from ESADE Business School. She also studied in Florida University and Copenhagen Business School.

Amy Jaffe

Dr. Jaffe is a leading expert on global energy policy, geopolitical risk, and energy and sustainability. Jaffe serves as executive director for Energy and Sustainability at University of California, Davis with a joint appointment to the Graduate School of Management and Institute of Transportation Studies (ITS). She is associate editor (North America) for the academic journal Energy Strategy Reviews and serves on the editorial board of the Journal of Economics and Energy and Environmental Policy. Jaffe's research focuses on oil and natural gas geopolitics, strategic energy policy, corporate investment strategies in the energy sector, and energy economics. Prior to joining UC Davis, Jaffe served as founding director of the Energy Forum at Rice University's James A. Baker III Institute for Public Policy. Jaffe is widely published, including as co-author of "Oil, Dollars, Debt and Crises: The Global Curse of Black Gold" with Mahmoud El-Gamal. She currently serves as a member of the US National Petroleum Council, an advisory board member of GE Ecoimagination, and chair of the Global Agenda Council on the Future of Oil and Gas with the World Economic Forum (Davos). Jaffe was honoree for Esquire's annual 100 Best and Brightest (2005) and holds the excellence in writing prize from the International Association for Energy Economics (1994). The Baker Institute Energy Forum, of which she was the founding director, won the prestigious Adelman-Frankel award for its contribution to the field of energy and economics in 2012. A widely quoted commentator on oil and energy policy, Ms. Jaffe writings have been featured by the New York Times, The Wall Street Journal, Dow Jones International, and Petroleum Intelligence Weekly. She has a regular blog on energy matters at the Houston Chronicle and contributes on energy and climate to the Wall Street Journal's The Experts.

Fabio Genoese

Dr. Fabio Genoese is a specialist in energy policy with several years of experience in the field of consulting. He is currently Research Fellow at the Centre for European Policy Studies (CEPS) in Brussels and Visiting Professor at SciencesPo in Paris. Before joining CEPS in September 2013, Fabio worked at Fraunhofer ISI in Germany from 2008 to 2013, where he managed policy-related research and consulting projects both for public bodies and for private clients in the energy sector. In 2012 he was a visiting researcher at Fondazione Eni Enrico Mattei (FEEM) in Italy. Fabio grew up bilingually with Italian and German, is fluent in English and has an intermediate level of French. He holds a doctoral degree in Energy Economics from the Karlsruhe Institute of Technology as well as a Master's degree in Physics.

Juan-Pablo Montero

Dr. Montero is Professor of Economics at the Pontificia Universidad Católica de Chile (PUC-Chile) and has held visiting positions at the MIT Sloan School of Business (2000-2001), Harvard's Kennedy School of Government (2005-2006) and Stanford's CLAS and Economics (Winter 2014). He received a Civil Engineering degree from PUC-Chile and M.Sc. and Ph.D. degrees in Economics from MIT. His research work concentrates on industrial organization, environmental economics and resource economics and has appeared, among others, in the *American Economic Review*, *Journal of Political Economy*, *RAND Journal of Economics*, *The Economic Journal* and *Journal of Economic Theory*. He is co-author of *Markets for Clean Air* of Cambridge University Press (joint with Ellerman, Joskow and Schmalensee of MIT). He has also been a consultant for the Government of Chile, private corporations and international organizations such as the World Bank.

Gerardo Bazán

Mr. Bazán is Director of Energy Projects at ON Partners Consulting in Mexico City. Previously, he worked as Director on Energy Information at the Mexican Ministry of Energy and Chief of Advisors to the Undersecretary of Hydrocarbons also in the Ministry of Energy. From 2001 to 2010 he was an advisor to four Pemex CEOs, in subjects like refining, natural gas and petrochemicals. In 2008 Gerardo Bazán became a member of the "Biofuels Task Force" on the World Energy Council in London. Gerardo Bazán studied Engineering at the Tecnológico de Monterrey in Mexico City. In 1995 he obtained a Masters Degree in Project Management at the University of Birmingham, England, and in 2001 he obtained a Masters Degree in Economics and Finance, specialized in energy projects, at the University of Manchester. Gerardo Bazán has published a number of articles on energy subjects and lectured at national and international energy forums.

Pablo Arocena

Dr. Arocena is Professor of Business Economics at the Universidad Pública de Navarra. He has been Visiting and Associate Fellow at the University of Warwick 1997-2001, and Visiting Researcher at Aston University, UK. His main research fields are Energy Economics, Efficiency and Productivity Analysis, Industrial Economics and the Economics of the Firm. His work has been published in academic journals like *Energy Economics*, *Energy Policy*, *Review of Network Economics*, *Journal of Industrial Economics*, *International Journal of Industrial Organization*, *Kyklos*, *Industrial and Corporate Change*, *Regional Studies*, *Journal of Economic Policy Reform*, *Health Economics*, *International Journal of Production Economics*, *European Journal of Operational Research*, *Journal of the Operations Research Society*, *Environment and Planning C: Government & Society*, *Safety Science*, *Small Business Economics*, *International Small Business Journal*. From 2001 he has been Principal Investigator of five successive research projects funded by the National Scientific Research, Development and Technological Innovation Plan. He is Vice-president of the Spanish Association for Energy Economics, and Associate Editor of *Business Research Quarterly*. From April 2012 is Dean of the Faculty of Economics and Business at the Universidad Pública de Navarra.

Louis-Gaëtan Giraudet

Dr. Giraudet is a Research Fellow at CIRED, a research center for energy, environment and development economics based in the Paris area. He received his PhD in Economics from Ecole des Ponts ParisTech in 2011. Louis-Gaëtan stayed at Stanford University's Precourt Energy Efficiency Center as a Postdoctoral Fellow from 2011 to 2012. His research focuses on the development of modeling tools to address issues in energy efficiency economics and policy, with applications to the building sector.

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