

Workshop

Economic Challenges for Energy

Madrid, 15-16 February 2017

Wednesday, 15 February

- 19.30 - 20.45 **Open Lecture: The Science and Policy of Sustainable Energy**
Daniel M. Kammen, UC Berkeley
- 21.00 **Workshop Dinner**

Thursday, 16 February

- 09.00-09.30 Welcome coffee
- 09.30-11.00 **Economic Measures or Regulations for Improving Energy Efficiency? Reflections After 'Dieselgate'**
Theodoros Zachariadis, Cyprus U.
- 11.00-11.30 Coffee
- 11.30-13.00 **A Summary of Future Energy Scenarios: Main Messages and Shortcomings**
Pedro Linares, EFE
- 13.00-14.00 Lunch
- 14.00-15.30 **The Role of Innovation in Meeting Energy Challenges**
Jim Watson, UKERC
- 15.30-16.00 Coffee
- 16.00-17.30 **Theory and Practice of Emissions Trading**
Luca Taschini, LSE
- 17.30-18.00 Coffee
- 18.00-19.30 **Challenges in Designing Power Markets: The California Experience**
Benjamin Hobbs, Johns Hopkins U.

The Science and Policy of Sustainable Energy | *Daniel M. Kammen*

The Paris Climate Accord presents a rare opportunity and platform for global cooperation toward the 80% or greater decarbonization target established by the UN/IPCC for mid-century. This target is challenging on its own, but is made more complex by the dramatic changes in the political climate that recent elections in the US, the UK, Italy, and elsewhere inject into the 'sustainability equation.' In this talk the national and regional systems and economic progress toward sustainability is assessed from a technical and social perspective. Energy access and climate protection emerge as critical synergistic needs and drivers of a new approach to clean energy and sound land-use management.

Economic Measures or Regulations for Improving Energy Efficiency? Reflections after 'Dieselgate' | *Theodoros Zachariadis*

Transport is globally the fastest growing sector in terms of final energy use and carbon emissions. The main policy responses for improving the energy efficiency of road vehicles in Europe have been the introduction of carbon dioxide emission standards for vehicles and several attempts to promote public transport, active mobility and Ecodriving. After the 'dieselgate', which has revealed that automakers may report artificially low emission levels and hence may not contribute to improved energy and environmental performance as much as the official statistics show, engineering experts and policymakers declared that the regulatory regime of vehicle emissions has to be tightened and monitoring should become more stringent. However, economists do not share the same view towards ever stricter regulations and enforcement mechanisms. Without questioning that regulatory policies can be effective, their analysis shows that economic incentives are more cost-effective, i.e. may achieve the same energy benefit at a lower cost to society. Could the 'dieselgate' trigger a partial phase-out of regulations in favour of market-based mechanisms such as carbon pricing or congestion charging? This talk will outline the pros and cons of the different policy approaches, focusing on road vehicles but also expanding the discussion to other energy-consuming appliances and equipment.

A Summary of Future Energy Scenarios: Main Messages and Shortcomings | *Pedro Linares*

This talk will review the main messages provided by the major prospective exercises in the energy sector (IEA, Shell, BP, IHS-CERA, Bloomberg, etc.) and will identify the elements in which they agree and those in which there are significant differences. I will then add some other themes that, in my view, have not been properly covered in these studies and which would also require preparation by energy companies and public administrations.

The Role of Innovation in Meeting Energy Challenges | *Jim Watson*

The presentation will focus on the role of innovation in energy systems. The energy sector is changing fast, and innovation is one of the key drivers of change. First, he will briefly outline why innovation is required to meet the energy policy goals that are prioritised by many countries. These include: to reduce emissions and greenhouse gases and other pollutants; to maintain or improve energy security; and to ensure that energy services are affordable. He will also explain why a broad definition of innovation is required that encompasses a spectrum of innovation stages: from R&D to commercialization. Second, Jim will discuss the main rationales for policy intervention to direct innovation to meet these goals. Whilst some innovation is driven by firms and other non-government actors, there are important market and system failures that mean governments also have a key role to play. Furthermore, he will argue that economic prescriptions for policy intervention that focus on public investment in R&D and carbon pricing are necessary, but not sufficient. Third, Jim will discuss the implications for policy – both for national governments and for international initiatives such as Mission Innovation.

Theory and Practice of Emissions Trading | *Luca Taschini*

In the last ten years, the use of markets to reduce pollution, particularly greenhouse gas emissions, has come of age. According to The World Bank, 39 nations and 23 sub-national jurisdictions now regulate carbon emissions through Emissions Trading Systems (ETSs), and 13 additional ETSs are at various stages of development. The Paris Agreement, adopted by 195 countries during the Paris Climate Summit in December 2015, opens a new era in international climate action, with much stronger support for ETSs. In this talk Luca reviews the theory and practice of ETSs through the experience of the European Union ETS and discuss carbon pricing around the world post Paris Agreement.

Challenges in Designing Power Markets: The California Experience | *Benjamin Hobbs*

Following the California power crisis of 2000-01, the state's electricity market was redesigned to include locational marginal pricing, forward contracts, financial transmission rights, and long run capacity obligations. As a result, market power has been tamed, although there is continuing controversy over whether prices fail to support needed investment in flexible generation capacity. Now the major challenges are integrating 50% renewables, limiting greenhouse gases, increasing distributed energy, and expanding the geographic market. I will review some of the market revisions that have been proposed to meet these challenges, including the economic principles involved and the practical issues. This discussion will highlight some of the important differences between the US and EU approaches to managing these challenges.

Daniel Kammen

Daniel M. Kammen is a Professor of Energy at the University of California, Berkeley, with parallel appointments in the Energy and Resources Group, the Goldman School of Public Policy, and the department of Nuclear Engineering. Kammen is the founding director of the Renewable and Appropriate Energy Laboratory (RAEL), and was Director of the Transportation Sustainability Research Center from 2007 - 2015. He has authored or co-authored 12 books, written more than 300 peer-reviewed journal publications, and is a frequent contributor to or commentator in international news media. Dr. Kammen is a fellow of the American Academy for the Advancement of Science, and the American Physical Society.

Theodoros Zachariadis

Theodoros Zachariadis holds a Diploma and a Doctorate in Mechanical Engineering from the Aristotle University of Thessaloniki, Greece. His postdoctoral work focused on the economic analysis of energy and environmental issues. He has worked as a researcher at the National Technical University of Athens and as a European Marie Curie Fellow at the Economics Research Centre (ERC) of the University of Cyprus. Currently he is an Associate Professor at the Cyprus University of Technology, teaching environmental economics and energy resource management, and a Dean of the University's Faculty of Geotechnical Sciences and Environmental Management. He is a member of the Scientific Committee of the European Environment Agency and an associate editor of the international Journal "Energy Economics". He is also an academic fellow at ERC, an advisor to the Cypriot Ministries of Finance and Energy on economic aspects of climate change and long-term energy planning, and a Board member of Green Budget Europe, a Brussels-based expert platform promoting environmental fiscal reforms. He is the recipient of the 2009 Research Prize of the Republic of Cyprus.

Pedro Linares

Pedro 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 MIT-CEEPR. 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.

Jim Watson

Jim Watson is Director of the UK Energy Research Centre and a Professor of Energy Policy at the University of Sussex. He was Director of the Sussex Energy Group from Dec 2008 to Jan 2013. He has 20 years' research experience on climate change, energy and innovation policy. His recent outputs include co-edited books: *New Challenges in Energy Security: The UK in a multipolar world* (Palgrave, 2013; with Catherine Mitchell) and *Global Energy: Issues, Potentials and Policy Implications* (Oxford University Press, 2015; with Paul Ekins and Mike Bradshaw). Prof Watson frequently advises UK government departments and other organisations. He was an advisor to the Government Office for Science for a Foresight project on energy (2007-08). He is a judge for the Queens Awards, a member of the Global Challenges Research Fund strategy advisory group and a member of the government's fossil fuel price projections panel. He has also been a Specialist Adviser with three Parliamentary committees. Jim has extensive international experience, including over ten years working on energy scenarios

and energy innovation policies in China and India. In 2008, he was a Visiting Scholar at the Kennedy School of Government, Harvard University.

Luca Taschini

Luca Taschini is an expert in energy economics, industrial organisation, environmental economics, finance and the application of economics to public policy issues. He is an Assistant Professorial Research Fellow at the Grantham Research Institute at the London School of Economics where he leads the Carbon Trading and Finance research programme. His current research investigates environmental markets and energy markets. More specifically, he is studying the functioning and design of transferable permit systems.

Benjamin Hobbs

Benjamin F. Hobbs is the Theodore M. and Kay W. Schad Chair of Environmental Management at the Johns Hopkins University, Department of Environmental Health & Engineering. Since 2010, he has been the inaugural Director of the JHU Environment, Energy, Sustainability & Health Institute. He co-directs the Yale-JHU SEARCH (Solutions for Energy, Air, Climate, and Health) Center, funded by the USEPA. Dr. Hobbs chairs the Market Surveillance Committee of the California Independent System Operator, which he has been a member of since 2002. The responsibilities of the committee including advising on market design changes as well as monitoring of market performance and behavior. Dr. Hobbs' research and teaching concerns the application of optimization and decision analysis to electric utility regulation, planning, and operations and to water and ecosystem management. His publications include three books and 160 journal articles, including several that have won best publications awards.

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