

Workshop

# **Economic Challenges for Energy**

Madrid, 28-29 January 2016



## Thursday, 28 January

13.00 - 14.30	<b>General Assembly, Economics for Energy</b>
14.30 - 15.00	Welcome and introduction
15.00 - 16.30	<b>Energy demand and energy efficiency</b> <i>Ibon Galarraga, BC3</i>
16.30 - 17.00	Coffee
17.00 - 18.30	<b>Long-term energy prospective</b> <i>Paul Appleby, BP</i>
19.30 - 20.45	<b>Open Session: Energy in Africa</b> <i>Dan Dorner, IEA</i>
21.00	<b>Workshop Dinner</b>

## Friday, 29 January

09.00 - 10.30	<b>Innovation in energy</b> <i>Greg Nemet, U. Wisconsin</i>
10.30 - 11.00	Coffee
11.00 - 12.30	<b>Energy and climate policies</b> <i>Carolyn Fischer, RFF</i>
12.30 - 14.00	<b>Energy security (Access to energy)</b> <i>Ignacio Pérez-Arriaga, Comillas-MIT</i>
14.00 - 15.00	Lunch
15.00 - 16.00	<b>Meeting of the Scientific Committee, Economics for Energy</b>

**Energy demand and energy efficiency | Ibon Galarraga**

Energy transformation and consumption account for a large proportion of anthropogenic greenhouse gas (GHG) emissions. Energy efficiency policies therefore form an essential part of climate policy and are a smart way of reducing the depletion of limited natural resources. Indeed, energy efficiency has been one of the mainstays of energy policy in recent years, be it for reasons of competitiveness in the economy, availability of resources or energy security or for other reasons of a more strategic, geopolitical nature.

Many efforts are currently being made to reduce fossil-fuel use in different sectors (e.g. transport, industry and building). The IEA estimates that energy efficiency measures can reduce global CO<sub>2</sub> emissions by up to 10–15% per year at no direct additional cost. The IPCC (2014) suggests that the investment path compatible with the 2°C scenario requires US\$336 billion in the coming 10-20 years in energy efficiency for the transport, industry and building sectors.

The EU Climate and Energy package sets the target of reducing energy consumption by 20% by 2020. However, there are several barriers that make this a highly challenging target. One of these is the so-called Energy Efficiency Paradox, i.e. private investments in energy efficiency that seem to be economically worthwhile are not always made, and at the same time some individuals make investments in EE when economically they would not appear to be worthwhile. This paradox can be explained by many factors such as insufficient information, principal-agent problems, lack of access to capital, divergences between social and private discount rates and consumer behaviour motivated by non-economic factors such as a desire to contribute to the public good.

This presentation will share some evidence that helps to explain this paradox, and some insights regarding policy instruments that can help to overcome it. The evidence will mostly look at the residential and transport sectors in Spain.

**Long-term energy prospective - the challenges of constructing a global energy outlook |**

*Paul Appleby*

The talk begins with a brief review of the projections from the BP Energy Outlook. This will cover the outlook for global energy demand - by region, by fuel and by sector – and an assessment of how that demand is likely to be met. Then we will look behind the headlines to see how the Outlook is constructed, highlighting the key challenges we face in trying to project the future path of energy markets. What drives the Outlook, and what does it really tell us about the future? What have we learned in the process of building these projections?

**Africa Energy Outlook | Dan Dorner**

Energy is a crucial enabler of economic and social development, and yet Africa's energy system falls far short of being able to meet the needs and aspirations of its citizens. This presentation by the International Energy Agency (IEA) will explore one of the most poorly understood parts of the global energy system, examining its future prospects – broken down by fuel, sector and sub-region – and show how investment in Africa's energy sector could stimulate more rapid economic and social development across the region.

**Public policy and innovation in low carbon technologies: 3 challenges | Gregory Nemet**

Addressing people's preferences for cleaner, more affordable, and more secure energy services will require a transformation of the global energy system over several decades. Innovation—the process of creating and adopting novel technologies, processes, and behaviors—is needed to make this transition technically possible, economically affordable, and politically feasible. In this talk I will discuss some of the most important challenges for public policy to enable this transition. To frame the policy issues, it can help to think of the process of innovation as a sequence stages, from basic research to widespread adoption of a technology. Policy makers can influence this process using “technology push” and “demand pull” policies. A first challenge is how to strike a balance between the two. A second challenge is how to enhance incentives when government commitments to future targets may not be fully credible, i.e. what if demand pull is fragile? A third challenge is whether and how governments should support technologies at the demonstration phase, sometimes known as the “Valley of Death.” At this crucial phase, incentives for private investments are weak but the track record of governance of

past projects is perceived as poor. I conclude with a research agenda, a brief summary of 7 missing perspectives on understanding energy innovation.

### **Strategic subsidies for renewable energy | Carolyn Fischer**

WTO agreements discipline the use of subsidies, particularly for upstream manufacturing or exports. Unlike tariff rules, the Subsidies Code lacks exceptions for transboundary externalities like human health or resource conservation, including those related to combatting global climate change. Yet support policies for low-carbon goods like renewable energy technologies are much more popular internationally than imposing a cost on carbon. Many interventions support downstream deployment of renewable energy technologies; others subsidize upstream development and manufacturing of those technologies. This paper examines the national incentives and global rationales for offering deployment, manufacturing, and R&D subsidies in producer countries, allowing that a sizeable downstream market may lie in third-party countries.

### **Comprehensive planning and sound regulation: The two key enablers of universal access | Ignacio J. Pérez-Arriaga**

What stands in the path towards achieving universal access? I shall argue that the absence of a sound regulatory framework and of a comprehensive electrification planning approach are major impediments for the success of any serious attempt at providing the electricity access that could dramatically improve the lives of so many people.

*Why is planning needed?* Available tools for rural electrification planning, properly used, can inform policy interventions by governments and support the mobilization of resources (public, private, and donor-funded) behind access initiatives. There are many potential impediments to successful implementation of such initiatives, including political and social barriers. But a case backed by scientific data, rigorously gathered, will always have a better chance of overcoming these barriers.

*Why is sound regulation so important?* Sound regulation is an indispensable condition to attract the vast amount of investment that universal access to electricity will require. The existence of a “viability gap” between the electrification cost and what the beneficiaries can afford—except for perhaps a bare minimum service of a couple of lights and a phone charger—has to be acknowledged. Sound regulation has to make sure that the viability gap will somehow be filled, and that the risk to private investors of not being able to obtain a reasonable rate of return is acceptable. Furthermore, regulation must be stable, effective and enforceable, and free of major flaws.

## Ibon Galarraga

Ibon Galarraga is Research Professor at the Basque Centre for Climate Change (BC3) and was also Deputy Director for the period 2013-2015. He holds a Ph.D. in Economics from the University of Bath (UK), a M.A. Economics from the University of Essex (UK) and a B.A. Economics from the University of Basque Country (EHU-UPV). Ibon has worked as an environmental consultant for both public and private clients and taught microeconomics and macroeconomics at the University of Bath and Economic Policy at the University of Deusto. He has a number of publications in the field of environmental and resource economics, energy and climate policy. During July 2005 and May 2009, he was the Deputy Minister for the Environment of the Basque Government, Executive Vice-president of the Environmental Public Society IHOBE and Member of the Board of the Basque Energy Board (EVE).

## Paul Appleby

Paul Appleby leads the analysis of long term energy market developments for BP. His career at BP spans 31 years, and includes a variety of roles in BP's gas and alternative energy businesses. Most recently he was the custodian of the investment appraisal process for BP's gas, power and renewables businesses worldwide. He received his theoretical training in economics at Cambridge University (MA and MPhil); and served a practical apprenticeship as a Fellow of the Overseas Development Institute, posted to Malawi. He is an associate lecturer in energy economics at the University of Surrey.

## Dan Dorner

Dan Dorner is a lead author of the IEA's flagship World Energy Outlook publication, as well as several of its special reports, including Energy and Climate Change, Africa Energy Outlook, Redrawing the Energy-Climate Map, Iraq Energy Outlook and Are We Entering a Golden Age of Gas? He also leads the IEA's work on energy access and its engagement with the UN Sustainable Energy for All initiative. Prior to joining the IEA, he was a Senior Economic Adviser at the Treasury in the United Kingdom where, most recently, he led a team of analysts working on global commodity markets and the economies of the Middle East, North Africa and the former Soviet Union.

## Gregory Nemet

Gregory Nemet is an associate professor at the University of Wisconsin-Madison in the La Follette School of Public Affairs and the Nelson Institute Center for Sustainability and the Global Environment (SAGE). He is also chair of the Energy Analysis and Policy (EAP) certificate program. His research and teaching focus on improving analysis of the environmental, social, economic, and technical dynamics of the global energy system. This work is motivated by a general interest in understanding how to expand access to energy services while reducing environmental impacts. He teaches courses in policy analysis, energy systems analysis, and international environmental policy.

## Carolyn Fischer

Carolyn Fischer is a Senior Fellow at Resources for the Future and currently a Marie Skłodowska-Curie Fellow of the European Commission, visiting at the Fondazione Eni Enrico Mattei (FEEM) in Venice, Italy. She is also a fellow of the CESifo Research Network and a member of Environment Canada's Environmental Economics and Policy Research Network. Previously, she has been a Visiting Professor at Gothenburg University; a Dahrendorf Visiting Fellow at the London School of Economics; a UCE3 Senior Fellow at the University of California at Santa Barbara; a Fellow at the Center for Advanced Study of the Norwegian Academy of Science and Letters; and a staff economist for the Council of Economic Advisers to President Clinton. She has served on the Board of Directors of the Association of Environmental and Resource Economists, and currently serves on the scientific board of Economics for Energy and the economics advisory board of Environmental Defense Fund. She is on the editorial board of the Review of Environmental Economics and Policy and the International Review of Environmental and Resource Economics and has been Associate Editor of Resource and Energy Economics. Fischer earned her Ph.D. in Economics from the University of Michigan at Ann Arbor in 1997 and her B.A. in International Relations from the University of Pennsylvania in 1990.

## **Ignacio J. Pérez-Arriaga**

MS and PhD (MIT, Electrical Engineering), and Electrical Engineer (Comillas University, Spain). MIT visiting professor since 2008. Professor and Director of the BP Chair on Sustainable Development (Comillas). Director of Energy Training (Florence School of Regulation). Former Commissioner (Spanish Electricity Regulatory Commission and Irish Single Electricity Market Committee). Member of Spanish Engineering Royal Academy. Member of Board of Appeal of EU Agency for the Coordination of Energy Regulators. Advisor of institutions in more than 30 countries.

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