

# Introduction to Panel 1

## Foundations of future energy policy

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The step change in energy efficiency that will deliver 2050 policy aims will only happen if we change the way we talk about energy efficiency: we need to present its benefits to politicians and policy-makers in language that they understand and respond to. We also need to change the way we think about energy efficiency: can we use the information we have in new ways to deepen our knowledge of the potential it has, and our understanding of how to achieve this potential. Panel 1 challenged authors to come up with these new ways of thinking and talking about energy efficiency. The result is a series of papers that see things in a different way, imagine the energy system of the future, explore how to change some of our conversations about energy efficiency and challenge some long-held beliefs.

### Addressing the dynamics of change

The dynamics of system change can depend on how well we understand the potential improvements that the change can deliver, and the ways in which different actors respond to drivers for change. Many papers in panel 1 address elements of system change. For example, Barbara Schlomann *et al* (1-473-15) demonstrate how the use of detailed, bottom up simulation models for scenario analysis can help us explore the likely impacts of a broad range of different types of energy efficiency policies and identify untapped potential. Neil Wallis (1-426-15) explains how a consistent and sustained approach to cutting carbon emissions from the UK road transport sector has not only produced emissions reductions but also supported a significant increase in investment in the low carbon automotive sector in the UK and in UK exports from the sector. Steven Nadel *et al* (1-059-15) explore how utilities, government and

the energy efficiency sector in Australia, Germany and the US are responding to major changes driven by declining sales of electricity, increasing use of distributed energy sources and policy responses to climate change. Catalina Turcu and Agneta Persson (1-087-15) compare and contrast approaches to refurbishment of multifamily residential buildings in four Eastern European cities.

### Seeing things in a different way

When transformative change is needed, the ability to view issues and potential solutions from a range of perspectives and with new framings is vital to overcome otherwise seemingly impossible problems. Panel 1 includes a series of papers that challenge the 'usual' way to look at energy use. Three papers consider how we use and express the information we have. Mithra Moezzi (1-415-15) demonstrates how measurement necessarily simplifies the complex systems surrounding and shaping our energy use, and hence how important it is for us to consider and challenge our quantification practices and recognise their limitations. Tim Chatterton *et al* (1-159-15) explore how new datasets can give us different insights into patterns of home energy use. Looking at high-energy users, they attempt to differentiate between areas of profligate energy use and those of high energy need. Sea Rotmann *et al* (1-181-15) discuss the use of different ways of storytelling to enable the numerous stakeholders involved in behaviour change work to overcome their differences and communicate the message that the energy system is, first and foremost, about human beings. Two papers consider how to view energy consumers differently. Hans Nilsson (1-477-15) examines why, in the context of mainstream economics, we are all market failures, and from this explains

why the role of ‘economic man’ in our policy analysis must be re-written. Yael Parag (1-030-15) examines the benefits of considering energy users as ‘prosumers’, who provide a range of services to the energy system, including demand reduction and response. One paper frames energy efficiency in a new way: Edith Bayer (1-388-15) defines energy efficiency as a ‘pipeline’ delivering reliable, cost-effective services, akin to a natural gas pipeline. Within this framing, she examines the key steps for building a strong efficiency pipeline and the importance of an ‘efficiency first’ approach to energy regulation and infrastructure planning. And one paper assigns responsibility for energy use in a different way: Laurent Meunier *et al* (1-428-15) examine French greenhouse gas emissions on the basis of consumption rather than within territorial limits, allowing embedded emissions to be considered.

### Valuing the multiple benefits of energy efficiency

The 2014 IEA report, ‘Capturing the multiple benefits of energy efficiency’, resulted in a lot of policy and research interest in these multiple benefits. Three papers in panel 1 address elements of this topic. Stanislas Nösperger *et al* (1-023-15) describe one method to help ensure that benefits beyond simple energy savings paybacks are incorporated into investment decisions for individual building projects and examine how this method can help to identify stakeholders who may become partners for such investment projects. Jonathan Jutsen (1-383-15) discusses how the concept of energy productivity may be useful in explaining the benefits of energy efficiency to individual companies and to the government in Australia. Joe Payne *et al* (1-424-15) analyse how the wider benefits of energy efficiency are recognised at the national policy level in the UK and explore the extent to which the current evidence base enables the inclusion of wider benefits in decision-making.

### New conversations in commerce and industry

Recognising the range of benefits of energy efficiency can enable new conversations about the value of investing in demand management. Three papers in this panel consider these potential new conversations in the commercial and industrial sectors. Catherine Cooremans (1-340-15) presents a conceptual framework for assessing and describing the competitiveness benefits of energy efficiency, which aims to shift businesses from the view of energy as a commodity and towards energy services as something of strategic value. Megan Strachan *et al* (1-163-15) examine how new approaches to energy use data management could support commercial real estate firms in adopting strategic energy-saving opportunities. Kathryn Janda *et al* (1-389-15) explain how a combination of top-down analysis of ‘big data’, middle-out organisational research, and

use of new bottom-up data can help to develop actionable energy and business insights in the UK retail sector.

### Is rebound bad? Is growth inevitable?

The issue of rebound has been contentious for many years: most agree that the scale of the problem it presents for energy efficiency is unknown; some even dispute its existence. Six papers here explore the issue from a very varied set of perspectives. Mona Chitnis and Steve Sorrell (1-049-15) present the latest understanding of the size of the rebound effect for a range of energy efficiency improvements in UK households. Grégoire Wallenborn (1-355-15) explores whether we can better understand the nature of rebound by examining the effect through four different disciplinary lenses. Rebound can often be portrayed as a negative effect, reducing the level of energy saving delivered. However, it can also be thought of as a positive thing; stimulating economic growth and employment. Sibylle Braungardt *et al* (1-384-15) examine the potential macroeconomic benefits of ambitious levels of energy efficiency investment in Germany. In contrast, Sofia Simoes *et al* (1-397-15) challenge our fixation with economic growth and examine whether considering a future with decreasing demand for energy services would affect how we define our energy efficiency goals. Continuing this theme of challenging the assumption of increasing energy services demand, Anja Bierwirth and Stefan Thomas (1-081-15) question whether the trend of increasing living space in Germany is consistent with what German households want, and offer some different housing concepts that can deliver the required services in less space. Stefan Thomas *et al* (1-060-15) explore the policy options that can be used to limit and perhaps even reduce the overall energy consumption of a household or a country.

### The system of the future

The electricity system is in a period of rapid change, enabled by a range of new technologies. Three papers examine different elements of the emerging ‘smart’ system. Stuart Schare and Angie Eide (1-359-15) describe the results of a demand response pilot in Hawaii and reflect on what this tells us about whether and how smart buildings can be used to maintain grid stability. Mark Ellis *et al* (1-038-15) explain the current status of net zero energy appliances, how recent technological developments might affect appliance reliance on grid electricity, and the policy implications of these developments. Chris Dunstan (1-403-15) examines how better information on network constraints, and hence on the value of different supply and demand alternatives in different geographical locations, can help to support network businesses in procuring least cost systems to deliver energy services.