Introduction to Panel 2
Energy efficiency policies: What delivers?

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Introduction

There are many energy efficiency policies in existence around the world, and much has already been written about them. So, why do we need yet more analysis, reflection and creation of new policy ideas? The simple answer is that huge potential for further improvements to efficiency remains, and that policy is often needed to overcome the multiple barriers which exist. Some of these barriers relate to the current economic system, the nature of energy efficiency itself, and processes of individual and organisational decision-making – not easy barriers to overcome. Careful analysis, using multiple perspectives and a mix of theoretical understanding and real world case studies, is what is required to advance knowledge, and fortunately that is what the authors in Panel 2 have delivered.

This panel focuses on energy efficiency policy and contains a wide range of topics which we have structured in four themes. The first theme considers what kind of national approaches to energy efficiency policies exists in different countries, how national efforts compare internationally, and presents new ideas for energy efficiency policies and practices. The second theme focuses on energy in buildings. It goes into the details of business models and strategies for building renovation and describes the methodologies for designing national renovation roadmaps. It also examines the role of professional and social contexts and suggests insights from parallel policy areas, e.g. air quality and sport. The third theme covers policy framework approaches, which have been newly developed and adopted from other jurisdictions. The fourth theme focuses on individual policy tools. It provides insights into approaches to financing energy efficiency based on utility obligation schemes and from shifting energy subsidies towards supporting manufacturing costs. It then presents ideas on how to improve further building and appliance standards and labelling schemes worldwide. Finally, some papers aim to identify what makes a 'good' policy tool.

The papers discuss policy in a wide range of countries within Europe, as well as USA, Australia and South Africa. Geographically, they could be classified as comparative studies, multi-country studies as well as in-depth studies of particular countries. All this is useful as we can learn from other countries, given a good understanding of national context.

Most papers focus on policies which are relatively long-established, refining and improving what is already in existence, and adding new considerations to existing policies (e.g. accounting for innovation in energy efficiency policy). The research has been carried out using a wide range of quantitative and qualitative methods, including modelling, economic analysis, interviews, surveys, and technical and engineering analysis. This demonstrates the multiple perspectives researchers are using to understand energy policies and their effects, and to develop new ideas.

National policy

ASSESSMENTS AND OVERVIEWS

What are the considerations for designing and applying different approaches to energy efficiency policies? Which policy efforts make energy efficiency policies the most effective? How do different national circumstances impact on effectiveness of these and those policies? Jan Rosenow et al. (2-276-13) describe reasons for a recent dramatic shift in UK policy. While the majority of EU Member States consider the introduction of the obligation schemes for utilities, the UK cancels them after several years of their operation. Instead the country in-

troduces an on-bill financing scheme for buildings retrofit and a feed-in-tariff for renewable energy. The authors also evaluate the impact of such policy shift on carbon emission reduction, fuel poverty, and employment in construction industry. Henrik Karlstrøm et al. (2-451-13) synthesize twenty years research on energy efficiency policies in Norway in order to understand how to make these policies more effective. The authors identify that Norwegian energy efficiency policies primarily looked at energy efficiency through the prisms of the economics theory and engineering. They suggest complementing the existing policy approach with regulatory tools and with policies which promote non-economic benefits of energy efficiency. Theo Covary and Ulrich Averesch (2-506-13) identify and evaluate the energy efficiency strategy and implementing policies in South Africa. Using an innovative methodology, the authors summarize this information in a form of a policy map. Following extensive consultation with key stakeholders, the authors provide an assessment of gaps, alignments and overlaps of the South African policy.

NEW IDEAS AND APPROACHES

As well as analysing the potential for existing policies to deliver a difference, authors have looked at new policies, and at transferring policy approaches from different spheres or geographical regions, and considered their possible contribution. Paolo Bertoldi and Caiman Cahill (2-522-13) argue that high quality reporting of energy savings in National Energy Efficiency Actions Plans (NEEAPs) submitted by the EU Member States under the requirements of the Energy End-use Efficiency and Energy Services Directive may be useful for several purposes. Above all, the documents allow better understanding the progress towards individual indicative Member States' targets and ultimately towards the EU energy efficiency target. Robert Passey and Muriel Watt (2-199-13) take as their starting point the decline in electricity consumption in Australia since 2008/09, and concern about ever-increasing prices. Current regulatory arrangements drive price increases and the authors conclude that current government responses to redress this are unlikely to be effective. Integrated Resource Planning is proposed as an approach which could deliver lower costs and electricity savings, but which would require new business models, regulatory approaches and more actively-involved customers to succeed.

Moving from an exclusive focus on energy policy, Jo Hamilton and Stephen Berry (2-105-13) use a comparison with sports policy, to take a new look at how energy efficiency advice and support is currently delivered. They argue that sport offers a model which includes both a professional training structure and supports a large community volunteer force, which runs most sporting activity, and that this model could be very valuable for energy efficiency. Reminding us of the connections between energy policy and other environmental issues, Sarah Keay-Bright et al. (2-145-13) highlight the links between EU climate and energy and air quality policy. They assess the extent to which current development air quality policy is integrating with climate and energy policy and where further integration could be possible. They identify many benefits from reducing both greenhouse gas emissions and other air pollutants and pathways for doing so.

COMPARING NATIONAL EFFORTS

There is continued interest in comparing national performance. Sara Hayes (2-047-13) presents the ACEEE international energy efficiency scorecard, an analytic tool that helps users develop a high-level snapshot of the overall energy efficiency of a nation, state, or province. The tool is based on the ACEEE's 2012 scorecard exercise, which analysed and ranked 12 of the world's largest economies on their overall energy efficiency. The scorecard methodology is described in detail, allowing a full understanding of how the tool works. Thomas Madry et al. (2-302-13) design a grading methodology to evaluate the quality of the governmental energy efficiency framework and policy packages based on the second NEEAPs. Following this methodology, the authors screened the documents and conducted the interviews with national experts and practitioners. Evaluation results for six selected member states were provided. The authors call for stronger standardisation of NEEAP reports and their stronger linkage to national legislation and policy documents.

Energy in buildings

RENOVATION OF THE EXISTING STOCK

Which models and policy combinations for buildings renovations have been proved to be successful? How significant is the remaining potential for the market transformation? Which policy elements could be changed to capture it? Aaron Gillich and Minna Sunnika-Blank (2-254-13) evaluate residential retrofit policies and market transformation strategies using two case study examples from the USA. As the final extent of the market transformation achieved cannot be known for on-going programmes, they use policy theory evaluation to assess market transformation potential based primarily on three criteria: outreach strategies, workforce relationships, and allocation of funds. Krushna Mahapatra and Leif Gustavsson (2-424-13) discuss marketing and policy measures to overcome various obstacles to energy renovation of detached houses in Sweden. They suggest that one-stop-shop business models, where a single actor offers all steps necessary for renovation, would make renovation much more attractive. This innovation could be combined with goals set by energy certificates, and targeted incentives to increase the rate of renovation. Veronika Czakó (2-161-13) assesses the progress towards the leading role of the public buildings based on the second NEEAPs and found varying levels of success in different EU Member States. While some countries introduced very comprehensive energy efficiency policies and measures in the sector, others experience shortfalls of such actions. She also suggests how the provisions of the recently adopted Energy Efficiency Directive could be improved for the public sector in case its progress insufficient to reach the EU 2020 energy efficiency target.

Extensive renovation of the existing stock will have consequences for energy supply as well as energy demand. Nguyen Le Truong et al. (2-417-13) use detailed calculations to work out the implications of ambitious low energy renovation of residential buildings on district heating systems of different sizes in Sweden. They calculate the impacts both in terms of the costs of district heating systems, and the primary energy needed to de-

liver energy services. They conclude that, if optimally designed, district heating systems of different scales can be compatible with increasingly energy efficient buildings.

PROFESSIONAL AND SOCIAL CONTEXTS

Professional and social contexts affect the development of new buildings, low energy communities and the renovation of existing buildings, as three authors illustrate. Tina Fawcett et al. (2-138-13) suggest new business and social models to support dissemination of eco-renovations in the UK and France. The authors study existing eco-renovation practices in these countries, identify the supporting policies and highlight gaps. To address policy shortfalls, the authors suggest considering some elements of the recently implemented innovative initiatives. The authors also argued that some barriers could be overcome switching to the model of over-time eco-renovations from one-off renovations. Craig Robertson and Dejan Mumovic (2-343-13) explore the way that actors in the design, construction and management industry interact with the contextual pressures throughout building procurement. The paper identifies where there are contradictions between aspects of the contextual pressures and the aspirations or methods of actors working within them, and suggests how legislation might use existing social, reputational or economic levers to better meet commitments to reduce carbon emissions. Claudia A. Barriga et al. (2-175-13) present case studies of five 'zero net energy' communities from across the world, with a particularly detailed case study from the USA. They highlight the institutional and behavioural aspects that these very different communities use to promote energy saving actions, and compare this with the options available at individual household level. Paying close attention to residents and their social context is shown to be key to achieving community-level goals.

RENOVATION ROADMAPS AND LESSONS FROM NEEAPS

The newly adopted Energy Efficiency Directive requires EU Member States to develop a strategy to renovate their existing buildings stock. Which methodologies can deliver high quality renovation roadmaps? Which lessons can we draw from the most successful past and on-going policies? Frank Klinckenberg and Mia Forbes Pirie (2-454-13) present a practical tool and information source for roadmap developers. It includes guidance on how building renovation roadmaps can be developed effectively and which elements they should include in order to deliver their full potential. Dan Staniaszek (2-285-13) continues on this theme and presents the guide for designing renovation strategies developed by the Buildings Performance Institute Europe. The author highlights and explains the factors which are crucial to consider while preparing such a strategy. Based on the second National Energy Efficiency Action Plans submitted by the EU Member States, Jean-Sébastien Broc et al. (2-354-13) study the barriers to energy efficiency penetration in the buildings sector and identify two key barriers. The authors then suggest the details and lessons from eight selected policies, which were recognized as 'best' practices among the EU-27, in order to overcome these barriers.

Policy making

NEW TOOLS AND APPROACHES

Policy making is becoming increasingly sophisticated and responsive to new knowledge and new circumstances. These three papers give examples of developments in policy design, knowledge gathering and implementation. Margaret Taylor and Sydny Fujita (2-517-13) investigate how regulators account for innovation in the Regulatory Impact Analysis (RIA) process which is used to set US federal energy efficiency standards, and what constitutes the 'best available approach'. They focus on two major examples of the use of learning curves in regulatory cost estimates for vehicle emissions controls and appliance energy efficiency standards. While there is much to learn about the best available approach to adjusting RIAs to consider technological change, the authors conclude that the learning curve approach holds great promise. Catherine Cooremans (2-459-13) describes a new audit tool for the Swiss canton of Vaud, to be used in an energy reduction programme with large-scale energy consumers. It uses a new conceptual framework, which characterises investment decision-making as being influenced by organizational and external contexts, the actors involved, and characteristics of the investment, in particular, whether an investment is judged as strategically important. The new tool should improve auditors' evaluation and reporting, and help increase the programme's performance. Violeta Kogalniceanu and Borko Raicevic (2-284-13) assess the progress of the Western Balkan countries, Ukraine and Moldova towards adoption of the EU energy efficiency policies. The authors identify and present the respective legislation and exemplary projects initiated by international financial intermediaries. The authors draw lessons from these experiences and suggest that more focus at regional level, cooperation between state and local authorities as well as among all relevant stakeholders may help overcoming associated barriers.

Policy instruments

OPTIONS TO FINANCE ENERGY EFFICIENCY

The finance barrier is recognized as one of the most critical to energy efficiency penetration. Tradable energy efficiency certificates and alternative market mechanisms are explored by three sets of authors, while a fourth considers financing of energy efficiency programmes. Regina Betz et al. (2-188-13) describe energy efficiency trading schemes in Australia, review their performance to date and compare them with international experience. They conclude that success with white certificate systems in Australia has been mixed, with variable compliance rates and little activity beyond increasing uptake of least-cost measures. They identify choices around coverage of sectors and eligible measures and the number of certificates ascribed to them as key design parameters. In contrast, Chris Neme and Richard Cowart (2-022-13) explore the potential for a new policy instrument, energy efficiency feed-in-tariffs (EEFiTs) to overcome barriers to investment in energy efficiency. They explain how such a tariff could deliver benefits, and use examples from policies with some of the same characteristics to explore the potential pros and cons. They debate in detail

key design issues, including the target market, pricing and payment structures, evaluating, measuring and verifying savings and administration. Iain McGill et al. (2-148-13) take a critical approach to analysing the theoretical underpinning and real-world experience of white certificate and related energy efficiency trading schemes, and commodification of carbon/energy savings. They highlight the difficult issues around additionality, and caution that considerable care is required with such approaches to energy efficiency policy lest governments merely add yet further market failures to those already existing for energy efficiency. Anand Gopal et al. (2-452-13) develop a model to calculate the potential energy savings, if household electricity subsidies were shifted to finance appliance efficiency programs. The authors apply the model to a set of appliances in Mexico, Russia, and the United Arab Emirates (UAE). They concluded that in Mexico and the UAE avoided subsidies can fully finance the entire incremental manufacturing costs of more efficient refrigerators, televisions and room air conditioners, while in Russia complimentary financing sources should be also used.

STANDARDS AND LABELLING

Many countries of the world have adopted standardisation and labelling schemes for buildings and appliances. How large are the remaining opportunities? How to improve the existing schemes? What can countries learn from each other? Neal Humphrey and Debbie Karpay (2-312-13) scope the existing standards and labels for appliances and equipment in the residential, commercial, and industrial sectors across 43 countries. The authors quantify opportunities for saving energy through additional coverage by these policies in 2030. They also provide recommendations how best to achieve additional energy savings from standardisation and labelling programs. Stéphane Arditi et al. (2-274-13) present the results of constructive discussions between stakeholders from NGOs and industry in preparation for revisions to the EU Energy Label in 2014–15. They present agreed guiding principles and illustrate three possible options for the revised Energy Label. The emphasis is on ensuring that the key objectives of continuously driving consumers towards the best appliances and stimulating innovation and differentiation are achieved, without the 'traumatic' decision-making experience which occurred in the previous revision. Niamh McDonald et al. (2-490-13) analyse and compare the best practice energy efficiency building codes from around the world. In consultation with other experts, the authors develop criteria for defining a 'dynamic best practice code', i.e. a code which continuously changes following the process of policy (re)design, implementation and evaluation. The authors apply the methodology comparing twenty-five regional and national building energy efficiency codes from Europe, China, US, India, South East Asia and Australia.

WHAT IS A 'GOOD' ENERGY EFFICIENCY POLICY TOOL?

Two sets of authors systematically analyse policies, in one case to identify 'good practice', in the other to look at application to a specific national context. Lena Tholen et al. (2-155-13) develop a multi-criteria assessment scheme to judge which energy efficiency policy tools are 'good practice' and which are not. The assessment scheme relies on a range of criteria and a standardized data collection. The authors demonstrated the application of the scheme for Energy-Efficient Refurbishment and Energy Efficient Construction programmes of the German public bank KfW. Carine Sebi et al. (2-117-13) measure to which degree the 'best practice' energy efficiency policies may be replicated in the French context. The authors assemble 107 such policies from international experience and design an innovative methodology which grades and identifies the most promising policies among them. The authors also apply a qualitative analysis in order to understand their strengths and weaknesses. The highest-ranking measures were found in the industry and transport in spite of the highest energy savings potential being in the residential sector. A further paper, by Christopher Granda et al. (2-418-13) consults experience of heat pump tumble dryers in Europe to investigate the potential for energy savings in North America from switching to this technology. The authors describe policy initiatives in Europe and North America and identify key lessons from the European experience.