

Introduction to Panel 6

Policies and programmes towards a zero-energy building stock

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Introduction

Buildings represent the largest energy-consuming sector in the global economy, accounting for over one-third of all energy and half of global electricity. As such it is a major focus not only for climate policy, but also for delivering energy security and economic efficiency. Under business-as-usual projections, global energy use in buildings could double or even triple by 2050. This will be due to increases in wealth, lifestyle changes, access to modern energy services and adequate housing, and urbanisation. Advances in technologies, know-how and policies provide opportunities to stabilize or reduce global buildings sector energy use by mid-century. However, strong barriers, such as split incentives, fragmented markets and inadequate access to information and financing, continue to hinder the market-based uptake of cost-effective opportunities. These barriers can be overcome by policy interventions addressing all stages of the building and appliance lifecycles. The IPCC AR5 points not only to technological opportunities, but also to significant opportunities arising from lifestyle and behavioural changes. Most options have considerable and diverse co-benefits in addition to energy cost savings. While the development of portfolios of energy efficiency policies and their implementation has advanced considerably over the last few years, more work needs to be done to meet ambitious public policy objectives.

As a leader in climate policy, a significant historical polluter, and a major economy with significant energy security challenges, the EU has an important role to play. In its 2011 Roadmap for Moving to a Low Carbon Economy in 2050, the European Commission explored pathways to meeting its climate change commitment of an 80–95 % reduction by 2050 over 1990. The analysis implied reductions from the building sector of some 90 % by 2050. A handful of policies at the EU level (EPBD,

EED, Ecodesign Directive) together with accompanying national policies (building regulations, information, training, incentives, financing tools) are in place which will help deliver this, but they will not be sufficient. The EPBD will be reviewed during 2016.

The EU and its Member States are making the journey together and in a global context. Across the world governments and other actors are reflecting on how to contribute to energy and climate policy goals through unlocking the enormous potential in buildings. This is to a certain extent reflected in the papers received.

A large number of interesting abstracts were received and the final panel comprises twenty-two papers and one display paper. These can be divided into five broad categories according to their main concerns:

- Conceptual clarification and comparison, and data access;
- Potentials for energy savings;
- Non-energy benefits;
- Implementing existing policies;
- Networks and actors.

Conceptual clarification and comparison, and data access

Four papers are concerned with a combination of conceptual clarification through international comparison and data access. Burt *et al.* (6-170-15) compare the programs, policies and initial results from public benchmarking policies in Eu-

rope, the United States and Australia, identifying key questions that must be answered in the coming years. Zhang *et al.* (6-169-15) provide an international overview of terminology and policies with respect to the more specific case of zero-energy buildings. From current international experience, they consider policy implications for China and other emerging economies working to develop goals for zero-energy buildings. Benchmarks are only as good as their data. Rivers *et al.* (6-461-15) draw attention to the poverty of data on existing buildings in Europe and the challenges this poses for the retrofit market. They are hopeful that over time, the EPCs will help change this situation for the better. The authors support their claim by highlighting good practice examples of EU member states collecting, analysing and making data available to a range of market actors. Anagnostopoulos *et al.* (6-261-15) share some of the optimism of Rivers *et al.* and describe how EPCs can be integrated into the practices of different property market actors.

Potentials for energy savings

Five papers address the potential for further energy savings in buildings at different scales. Zhou *et al.* (6-301-15) quantify the technically feasible and cost-effective energy efficiency opportunity in China's residential and commercial buildings to 2050. They argue that appropriate policy can keep China's baseline building energy consumption to levels comparable with current use. Shukla *et al.* (6-020-15), Madonna (6-057-15), and Fawcett *et al.* (6-321-15) all focus on savings potentials in the residential sector: respectively the residential sector in India, Italy, and from the introduction of heat pumps residential heating globally. Petrichenko (6-460-15) offers a paper highlighting the importance of synergies between energy efficiency and solar energy in the transition towards NZEBs on the global and regional levels.

Non-energy benefits

Three papers explore some of the multiple benefits from improving the energy performance of buildings in particular as a strategy to reduce fuel poverty and reducing Europe's energy import dependence. Kontonasiou *et al.* (6-147-15) describe the extent of fuel poverty in the EU, present various definitions used, assess potential measures to alleviate its impact, and outline the role of energy efficiency in buildings in tackling the problem. Dubois (6-450-15) draws lessons for alleviating fuel poverty based on an analysis of the French Programme "Habiter Mieux". Finally, Bettgenhäuser and Hidalgo (6-153-15) put the idea of energy efficiency as the first fuel to the test by examining

the impact of deep renovation measures on the energy import balance in 2030 and 2050.

Implementing existing policies

Seven papers reflect, in different ways, on the experience so far with existing policy approaches. Staniaszek (6-021-15) provides a critical assessment of national building renovations strategies which EU member states are required to develop, and makes recommendation on how the process can be improved. Wu and Hou (6-192-15) are also concerned with the process of developing national roadmaps for improving the energy performance of buildings, this time for the commercial building stock in China. The authors' main concern is with the development of a new roadmap, rather than the assessment of existing roadmaps. Pehnt (6-104-15) examines the emerging long-term perspective, not at an aggregate level such as with national building renovation strategies, but rather at the level of the individual building. He considers what implications of such a long-term perspective may have for other policy instruments. The Green Deal scheme in Great Britain is an example of such a long-term perspective at the level of individual buildings; Jenkins *et al.* (6-141-15) offer a critical assessment. Kunkel and Kontonasiou (6-127-15) argue that indoor air quality, thermal comfort and daylight requirements should be given greater importance in EU level requirements and national building codes. Kranzl *et al.* (6-360-15) are, understandably, interested in what drives the impact of future policies for energy efficiency in buildings. Finally, Karavai and Petrichenko (6-275-15) encourage us to consider the potential for NAMAs as a driver for improving the energy performance of buildings in tropical and sub-tropical climates.

Networks and actors

Four papers focus on the actors or networks of actors involved in delivering better performing buildings. Persson *et al.* (6-045-15) compare the impact of two Swedish networks of property owners working to improve energy performance in the built environment. Wahlström *et al.* (6-103-15) describe the implementation in Sweden of a methodology to help building owners feel comfortable about going further when investing in their buildings to improve energy performance. Owen (6-195-15) analyses the real motivations for SMEs in engaging with low carbon retrofit and suggests opportunities for policies and programmes that could support the potential of SMEs in achieving large scale retrofit in the residential sector. Economidou and Bertoldi (6-232-15) reflect on the perennial challenge of split incentives and how various regulatory measures, contractual solutions and financial mechanisms can help address this.