Introduction to Panel 5
Saving energy in buildings: The time to act is now

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Introduction

There is a common understanding that the potential for energy savings in residential and commercial buildings is huge and that this must be a priority area in the fight against climate change. Using less energy in buildings is also important for improving the security of supply and reducing the dependency of external suppliers of fossil fuels.

Although there are numerous examples on how energy savings in buildings can be obtained in a cost-effective manner, the pace of concrete actions is too slow. What is needed from a policy perspective to actually make the savings in the buildings happen today?

The biggest challenge lies in the transformation of existing buildings. What policies can be effective in promoting energy efficient renovations and refurbishments?

In the EU all new buildings must be "nearly zero energy buildings" by 2020. What is needed in terms of policy for innovation and commercialization of innovations to make this happen?

eceee 2011 Summer Study's panel 5 addresses the challenge of realizing the potential of energy savings in buildings. The panel is structured around the lifecycle of the building, from the conception and construction stages to the life of the building followed by refurbishment or demolition. For each phase various policy options for increased energy efficiency are discussed, and possible ways forward are pointed out.

The role of different actors, such as architects, and the role of networks, such as SME networks, are analysed, especially in relation to the diffusion of innovations in construction. When it comes to refurbishment, Energy Performance Contracting is a promising policy tool, perhaps mainly for the public and social sectors. Consumer information, such as labelling, is likely to make a change but has some way to go before it is used to its full potential.

The opportunities for energy savings in buildings are a key element in climate policy due to the long lifetime of buildings. A long-term emissions reduction target, beyond 2020, is dependent on policy choices in the building sector today. This is why panel 5 includes a future-looking session, with scenarios for buildings, communities and cities for 2050.

Energy efficiency remains a secondary criterion in the choice of property. Price, size and location are by far more likely to influence the choice than energy standards. This is why the cross-sectional part of panel 5 looks into how energy efficiency parameters could be taken into account for the value of the property.

The topic is broad and many high quality abstracts were received. As panel leaders, we regretted not being able to include more of them.

Policies during the lifecycle of the building

The panel groups **26 papers** and **12 posters** covering a broad spectrum of challenges related to energy efficiency in buildings. The structure of the panel follows the life of the building – from the conception over the lifetime including refurbishments to the vision for the future.

BEFORE CONSTRUCTION STARTS

One of the most effective ways of ensuring low energy use throughout the life-cycle of a building is of course to make energy efficiency one of the guiding principles for the design of the building. This is true not only for the construction of nearly

zero energy buildings and passive houses but can also be introduced in all new constructions.

Heimo Staller and Wibke Tritthart (5-291) present in their paper findings on how life cycle analysis can be introduced already at the time of the architectural competition. The findings are based on the EU FP7 Project "Assessment of energy and sustainability aspects in architectural competitions". David Eijadi et al (5-267) and Gerhard Hofer et al (5-068) in their papers respectively address how decisions made in the early design phase can be used in order to encourage energy efficient buildings.

Unfortunately, making the decision at an early stage is not always enough, and this is why Henrik Teglgaard Lund and Dorthe Bechmann (5-347) in their paper address policies and tools to help construction clients preserve the low energy design goals throughout the construction process.

The new Energy Performance of Buildings Directive (EPBD) requires that all new buildings are "nearly zero energy buildings" in 2020 (2018 for the public sector). This means that the barriers for climate friendly buildings that have been identified by Åsa Wahlström et al (5-123) in the paper "Nordic market for climate friendly buildings – status, barriers and opportunities" and by Åke Blomsterberg and Karin Engvall (5-171) in the poster "Overcoming barriers to implementation of very low energy residential buildings in Northern Europe" need to be tackled.

Innovations in construction are a must in the coming years. The role of architects in the adoption of innovations in buildings has been studied by Kerstin Hemström et al (5-153) and the role of SME networks in spreading innovations has been analysed by Erwin Mlecnik (5-008).

WHEN THE BUILDING IS FINALIZED AND BEFORE REFURBISHMENT

The major challenge in realizing the potential for energy efficiency in the building sector is related to the existing buildings. Many of the papers in this panel address this important topic, and for the summer study they have been separated in two groups: "Before refurbishment takes place" which deals with savings potentials, consumer information and general policies for existing buildings and "At the time of refurbishment" which deals with renovation schemes in different housing sectors (commercial, social etc) and related policies.

The potential for savings is large and in the paper by Marina Economidou et al (5-286) an overview of the current situation as regards potentials and policies in place in each country within the EU27 is presented. Other examples are the paper from Kim B. Wittchen et al (5-507) where a case study of the potential for savings in the Danish building stock is presented and the poster from Eoin Ó Broin et al (5-281) where the efficiency gap in Swedish space and water heating is quantified.

Lorraine Murphy and Frits Meijer (5-131) and Kathryn Janda and Yael Parag (5-249) have analysed various policy options to address energy efficiency in existing buildings. Among the conclusions that can be drawn is that different types of change agents can play a key role and that Energy Performance Contracting (EPC) is likely to be an important tool in the future. (Energy Performance Contracting is the topic for several papers in the next session "At the time of refurbishment".)

Consumer information through labelling has been successful in the appliance market (refrigerators and other white goods). Is it possible to replicate the success to the building sector? Sean Penrith et al (5-424) in their paper present a US pilot for a centralized energy labeling infrastructure and Mattias Deutsch (5-251) discusses the merits of Internet as a place to disclose building energy information to consumers. This session also includes a poster from Christian Lüders and Annika Laybourn (5-343) entitled "Danish home energy check – an innovative tool to help home owners consolidate their knowledge about energy efficiency in their homes".

AT THE TIME OF REFURBISHMENT

Policies at the time of refurbishment include, among other policy options, Energy Performance Contracting, financial aid, renovation schemes and consumer information. The barriers and drivers to energy-efficient renovation have been analysed by Véronique Beillan et al (5-072) and Véronique Gosselain et al (5-423), the latter as regards the situation in Latvia and Bulgaria.

Energy Performance Contracting in the public/social sector is addressed in the papers by Eshien Chong et al (5-302) and Christophe Milin and Adrien Bullier (5-050). In relation to service markets, Gavin Killip (5-240) has investigated if market transformation approaches can be applied to service markets.

Martin Pehnt and Ulf Sieberg (5-247) discuss the possibilities of introducing a new building renovation instrument in the form of a long-term renovation schedule. Dominique Osso et al (5-226) on the other hand looks at demolition of old houses as an alternative to refurbishment in order to improve efficiency and limit urban sprawl.

Stanislas Nösperger et al (5-516) in their paper present a system of professions approach to low-carbon refurbishment and Sergio Tirado Herrero et al (5-250) look at the co-benefits related to deep retrofitting with examples from the Hungarian building stock.

The session also includes the following two posters: Jonathan Villot et al (5-152) "Understanding the challenge of housing refurbishment using decision tree" and Michael Reuss and Sarah Allingham (5-351) "Find a tradesman in Denmark (Håndværkerlisten)".

IN THE FUTURE – POLICY SCENARIOS AND SIMULATIONS

The majority of the buildings that will exist in 2050 have already been built. This means that future climate policies to a large degree depend on building policies already in place today. This leads us to the question of how far buildings can take us in solving climate change, which has been addressed by Diana Ürge-Vorsatz et al (5-429) in their paper. Other future scenarios are included in the poster by Kjell Bettgenhäuser (5-169) entitled "40 % CO_2 saving target in the German building stock up to 2020" and the paper by Anja Bierwirth et al (5-160) entitled "Living in a low carbon city: Wuppertal 2050".

Other posters in this session include Les Shorrock (5-019) "Time to change", Daniela Kletzan-Slamanig et al (5-141) "The transition to energy efficient buildings in Austria: An extended technology wedges approach" and Yohei Yamaguchi et al (5-274) "Transition scenario of Nakanoshima business/cultural area: A model of low-carbon district in warm climate".

CROSS-CUTTING

A whole range of policies at the different stages of the life of a building have been discussed and analysed. But so far, the influence of the energy efficiency measures on the property value have not been analysed. Therefore, a cross-sectional session has been introduced in the panel which groups this topic and other more general discussions.

In their paper, Adrian Bullier et al (5-052) are assessing the green value of sustainable buildings and Walter Hüttler et al (5-301) are addressing methodologies, barriers and impacts of energy efficiency and other sustainability aspects into property valuation. In addition, the case for energy efficiency property purchase taxes is being analysed by Darryl Croft and Louise Sunderland (5-214).

Andreas Koch and Sebastien Girard (5-545) have studied urban neighbourhoods as an intermediate scale for the assessment of the energy performance of buildings and Vera Höfele and Stefan Thomas (5-358) in their poster present policy packages to make energy savings in buildings happen.