

SESSION 18

BUILDING CODES – REVIEW AND IMPACT ASSESSMENT

Moderator: Aleksandra Novikova, Climate Policy Initiative at DIW-Berlin

PAPERS:

European Survey of the Energy Performance of Buildings and Related Policies – Results and Lessons Learned

Marina Economidou, Buildings Performance Institute Europe

Joana Maio, Buildings Performance Institute Europe

Codes to Cleaner Buildings: Effectiveness of U.S. Building Energy Codes

Jeff Deason, Climate Policy Initiative San Francisco

Andrew Hobbs, Climate Policy Initiative San Francisco

SESSION SUMMARY:

The session reviews and analyses existing energy efficiency building codes. The codes are one of the most widespread regulatory instruments for energy efficiency improvement of new constructions worldwide. Recently, several countries have also made an attempt to apply the codes to existing buildings undergoing efficiency upgrades. The papers of the session focus on two geographical areas, the U.S. and the European Union. Using different methodologies, the papers review the state codes in the U.S. and the codes of the European Union Member States. The European paper conducts a comparative analysis of the codes implemented by the European Union Member States. The U.S. paper performs an ex-post impact evaluation of the building code implementation. Further, the key conclusions of the papers are detailed.

The paper of Marina Economidou and Joana Maiou summarizes the results of the European-wide survey of building energy performance and policies regulating it. The paper goes into high level of details for the building codes. It classifies the European codes, reports their current status, and compares their stringency. The research relies on rich information collected through the survey, which was run with help of national consultants. The key research tools are an analysis and a comparison of the survey data in a common framework. The authors conclude that the prescriptive requirements for building parts, components, and systems are widespread. In addition to them, the performance-based requirements to the whole building have been introduced in many European Union Member States following the implementation of the European Buildings Performance Directive. In regards to the latter, it is interesting that there have been no two countries, who have adopted the same approach. It is important to mention that codes cover usually the residential sector and only a few non-residential building types. The paper concludes that the gap between the codes and actual performance of construction is increasing as the codes become more demanding, therefore enforcement and controls procedures are important to introduce.

The paper of Jeff Deason and Andrew Hobbs evaluates the impact of the residential building codes implemented in the U.S. The paper, first, describes the development process of the federal model code and the state codes and, second, tracks their historical modifications. The paper then assesses the impact of the code introduction using residential energy use data at the state level. The research tool is the time series regression analysis. The paper concludes that the building code introduction results in a decrease of household energy consumption by ca. 10% as compared to such household without the code. The impact, however, is different for households using different fuels and, furthermore, the code may cause the fuel switch. Taking into account construction affected by the code, the authors estimated that the building code reduced the U.S. residential primary energy consumption by 1.3% in 2008. The authors also found that the existing engineering estimates of

energy consumption reduction associated with the codes may be lower than the actual reduction of energy consumption.

In summary, the session suggests that building codes remain the important tool to regulate energy consumption of construction. The approaches to the building code design vary widely. The session panelists concluded on effectiveness of building codes in terms of delivered energy savings. Furthermore, actual savings may be higher than those, which are evaluated ex-ante. The time series regression analysis is a useful method for the building code impact evaluation. The role of building codes may further increase in light of commitments of many countries worldwide on low energy construction in the short- and medium-term future. Therefore, enforcement and control of building code compliance gain importance.