Introduction to Panel 7 Appliances, product policy and the ICT supply chain

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Introduction

Mandatory minimum efficiency standards for appliances and consumer electronics have been implemented in virtually all OECD countries, and such standards are increasingly combined with mandatory and voluntary energy labeling schemes. There is increasing evidence that product related policies for energy efficiency are currently among the best performing policies for delivering energy efficiency and that they are very cost-effective. While current policies have mainly addressed the low hanging fruits, there is a potential to set more stringent standards and address a wider group of energy relevant products. This however requires that we address a number of issues that are highlighted in the papers of Panel 7. Some issues are not new but anyway key to the design and implementation of energy efficiency policies, such as knowledge on energy consumption relating to appliances and ICT, the products features and how users relate to them, and scenarios for sustainable energy use and policies to get there. There is also a need for more research on evolving technologies, and provide the foundation for the energy efficiency community to explore new "smarter" policies: progressive standards, better measurement standards, digital labelling, regulating 3D printers, etc.

Knowledge and scenarios

Effective policy interventions require good information on appliance ownership and use, and the possible future trends. The stringency of policies, as well as their scope, can vary between jurisdictions. The EU has been at the forefront in some cases, but has a lot of potential to develop its practices.

Using data collected in a large Household Electricity Survey monitoring electricity use at an appliance level in 250 households in England, Dunbabin et al. (7-009-15) analyse the relationships between the real-life energy consumption and the declared consumption on the label, the saving potential, the impact on the peak electricity demand and how monitoring studies can feed in building models and social studies. Fridley et al. (7-155-15) also use current knowledge to present a forecast on China adopting superefficient technologies for major residential appliances through 2050. They conclude that cost-effective efficiency improvements in key appliances and building equipment hold the second biggest energy-savings opportunity in the building sector after passive design but that it has policy implications. Toulouse et al. (7-058-15) elaborate scenarios of appliance ownership in France by 2030. A main conclusion is that energy use can be cut despite the increased sizes of appliance if the right policy mix is enacted.

Putting things into perspective, Reeves et al. (7-411-15) examine how the EU compares to other major economies in product coverage and policy stringency for comparable products, as well as the costs and benefits of increasing the coverage and stringency of European standards to match best practices. But will these best practices be sufficient to reach the energy savings needed to mitigate climate change? Though energy efficiency of a range of domestic appliances has improved significantly over the last 15 years, in many EU countries, the power consumption of the residential sector has remained relatively constant or even continued to grow over this period. Brischke et al. (7-294-15) look for new strategies relying on energy sufficiency in Germany. They provide a detailed definition and propose how it could be used in pol-

icy making. Also Hinchliffe (7-089-15) advocates that thinking should be broader: he analyses the use of EU products in developing countries, on the second hand market, and how it affects projected savings under the Ecodesign Directive.

The ever-promising policy tool: energy labelling

The EU energy label will soon evolve, and all stakeholders call upon this evolution. There is much potential to develop energy labelling and the awaited decisions will impact many product markets. Panel 7 authors provide ideas on how the EU label could evolve: Baton et al. (7-475-15) use case studies from Australia and China, showing label rescaling is both practical and possible. They provide examples of stakeholders' strategies and conclude on the power of well-conceived labels. Lock and Arditi (7-381-15) explore one of the possible future of the EU energy label: what if it would go digital? Other economies have started a "digital switchover", and even if there is not yet a lot of insight, potential implications are promising for reaching out consumers and for policy design. Brocklehurst (7-158-15) proposes input from research at the EU and Member States levels on CO_2 car labelling that could be usefully applied to appliance labelling.

Smarter policies for progressive standard setting

For some product groups under technical development there is a need for quicker updating of standards. Using lighting as an example, Bennich et al. (7-337-15), demonstrate how evidence-based data is needed for products experiencing a rapid technological improvement curve, and stress the need for capacity and competencies among public agencies to conduct regular analysis. Van Buskirk (7-305-15) examines how the introduction of certain features, such as measures to enhance market transparency and the acquisition of crowd-sourced data, can help accelerate long-term technological innovation. deLaski et al. (7-412-15) have used focus group studies and interviews to predict the next generation of product energy efficiency standards; this has resulted in a catalogue of ideas to go forward and a better understanding on the potential pros and cons of various measures.

Policies promoting innovation among front-runners are also important to trigger innovation and market dynamism. Gallinat et al. (7-378-15) account for The Global Efficiency Medal competition that encourages the development, production and sale of super-efficient lighting products. The competition provides an opportunity for manufacturers to distinguish themselves in the market and it informs policymakers who are considering policies to promote high quality, energy-efficient LED products. Weyl et al. (7-376-15) present a similar competition for electric motors, where award-winning motors are 1.5–6.4 % more efficient than the average motor sold in each corresponding regional market. It was however found that new technology motors, requiring an electronic controller, were ineligible for the competition due to the absence of an internationally accepted test procedures, highlighting the need for development of such procedures.

Consumer behaviour: can it be taken for granted?

It is increasingly understood that consumer behaviour has a large importance for the actual energy use of appliances, and whether expected policy scenarios will take place.

Regulations often encourage appliances' users to go for "eco modes". Sivitos et al. (7-323-15) question whether these eco modes are really efficient, and whether they are really used in practice, for a variety of reasons. They analyse the policy implications and provide ideas to improve the situation. Cabrera et al. (7-251-15) analyse a programme developed to replace inefficient lamps in households. They conclude that all expected savings have not been realised due to unexpected circumstances and consumer behaviour, highlighting the need for periodic revisions of policy scenarios. Using a qualitative approach in Sweden, Glad (7-338-15) shows that conscious designs of things, of information, of schemes, practices and spaces are seldom used in attempts to influence user practices to save energy. Yet they could help compared to the more common tools used to address users, general information and regulations, that actually seem to confuse users.

Schilcher et al. (7-493-15) stress the importance of supporting consumers in their purchase decisions by providing up-to-date information about the most energy efficient products on the market and by supporting consumers in leading an energy efficient and eco-conscious lifestyle. The paper presents ecoGator, the first app which can scan and process data from the EU energy label by using a smartphone's built in camera. It highlights the importance of well-designed functions for consumer interactions.

Market surveillance: should it be centred on labs?

Mandatory standards and labels only work effectively if market actors know that monitoring and enforcement is carried out. There is currently a lot of interest on how to develop cost-effective monitoring and tests methods. Using a large European data set of washing machines tested in different laboratories, Stamminger and Schmitz (7-012-15) propose, in order to better assess the results of product testing and the quality of this testing activity, to compare the relative standard deviation with the expanded uncertainty of a specific measurement result. This allows assessing the repeatability of the machine cycle itself and the accuracy and repeatability of the testing in a specific laboratory. Sandvall and Lopes (7-185-15) discuss the role of independent product testing in energy efficiency policy. The paper highlights the importance of having in-house testing capacity for authorities responsible for regulations, market surveillance and promotion activities. It further discusses the advantages and drawbacks of having in-house testing capacity within the authority responsible for policy decision and/or market surveillance. Nielsen and Westphalen (7-491-15) account for a project where new ways of enforcement were explored: laboratory testing has been complemented with documents inspections but also new, 'softer' ways of achieving a higher compliance rate among regulated product groups, e.g. through dialogue and informational activities. Lock et al. (7-234-15) present the first results of a concrete market surveillance project on TVs: product tests showing good compliance and leading to capacity building with European testing laboratories, verification in

shops showing high rates of non compliance, and constructive dialogue with market surveillance authorities.

The scope of product regulation

Specific programmes based on regulation or mixed with regulations can also achieve energy saving potentials. For example the availability of a 20 °C cycle with an information campaign: Josephy et al. (7-187-15) explore the potential for "cold" washing of clothes. It is showed that washing at 20 °C saves on average around 60 % electrical energy compared to the 40 °C programme. Often, cold wash can reach similar results as traditional washing, but quality of detergents and other factors play a role. Another option to influence consumers is to set-up rebate programmes to pull higher efficiency technologies into the market. de la Rue du Can et al. (7-445-15) analyse several of such programmes for air conditioners and make recommendations for design of this type of policy.

Page et al. (7-107-15) argue on the importance of not only monitoring the active mode of smart lamps, but also the standby mode. The results highlight the importance to develop test procedures also for standby, dimming and colour tenability. de Almeida et al. (7-215-15) look at proposed EU policies for electric motors, and how they would constitute a much higher ambition level than current standards. McAlister and Tait (7-492-15) also look at standards to investigate on the status of and practical steps towards global harmonisation of test standards and energy efficiency policy requirements, focusing on televisions. They propose a methodology to facilitate the development of internationally comparable and aligned representative efficiency thresholds.

New products are always a problem for regulation: will their energy consumption be large enough to regulate, is it possible to develop a measurement standard, study typical use pattern, etc.? Wood and McAlister (7-125-15) look at 3D printing and its environmental impacts, which relate to energy, resource use, emissions and waste. They advocate policy decisions to have a chance to influence the growth of this technology diverting it from a potentially damaging path to one that positively improves the environmental impacts in the manufacturing sector and during the use phase. Janssens (7-202-15) analyses the first experience with labelling a building product: windows. Though the regulative process is not yet finalised, the analysis of the draft texts highlights the barriers inherent to this type of product in the context of labelling.

Concluding remarks

The contributions provide a good overview of the current issues in relation to product policies for energy efficiency and will advance the ongoing debate and trigger new thoughts and perspectives. In the future we expect more focus on how to regulate products that are part of systems, and how to combine instruments in a well-designed policy mix to advance energy efficiency of product and service systems.