

Introduction to Panel 1

Policies and programmes to drive transformation

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Industry represents nearly one third of global final energy consumption and will influence whether emission reductions targets both in Europe and globally are achieved. Energy efficiency presents the means for European industry to not only reduce energy use and emissions, but also improve productivity, competitiveness and profitability. Government policies and measures are a key driver for improved industrial energy efficiency, and when properly developed, implemented and enforced, can incentivise industry to go beyond business-as-usual. How policy can achieve this outcome is the challenging question which will be explored through the papers and presentations in Panel 1.

The panel firstly takes stock of policies and measures currently or previously implemented in Europe, with specific policy measures then explored in more detail. Market based instruments, which include obligation and white certificate schemes, have been implemented by EU members in response to Article 7 of the Energy Efficiency Directive. The progress and lessons from these schemes are examined in the second theme of Panel 1. Public funding and support measures are assisting industry with the implementation of efficiency measures with longer economic paybacks and the challenges faced administering these measures are discussed. The growing application of energy efficiency networks to build knowledge and capacity are examined, with the experience from Germany, where ambitious targets have been set for the establishment of networks, a key feature. Finally challenges and future opportunities for industrial energy efficiency policy are examined.

Industrial energy efficiency policies in the EU

While the central energy and climate policy instrument within Europe is the Emissions Trading Scheme, it has not driven improvements in industrial energy efficiency to the required ex-

tent. Kotin-Förster et al. (extended abstract 1-027-18) discuss incentives for energy efficiency and the design of policy instruments within the industry sector, which, due to the variable nature of the sector, cannot rely on a single generalist approach.

To build on the discussion about the need for a differentiated policy approach between EU member states, two presentations will examine current and past EU policy in more detail. Bertoldi & Economidou (peer-reviewed paper 1-113-18) examine some particularly successful industrial energy efficiency policies within Europe. The lessons learnt from these policies are used to make recommendations on potential future policy packages to stimulate further energy efficiency in the industry sector. Serrenho (extended abstract 1-116-18) focuses on the industry measures implemented by EU member states as part of the transposition into national policy of the Energy Efficiency Directive, including their potential impact.

Voluntary agreements are a key part of industrial energy efficiency policies in several EU member states and have been in force for an extended period. Cornelis et al. (peer-reviewed paper 1-001-18) analyse the extended history of voluntary agreements in Europe and reflect on the future of this policy mechanism, including how the design aspects of these policies have changed and are continuing to change.

Market based instruments

Market based instruments (MBIs) are becoming an increasingly prominent part of growing the market for energy efficiency within Europe. Rosenow & Cowart (extended abstract 1-004-18) provide an overview of different forms of MBIs, like energy efficiency obligation schemes, auctions, and white certificates, describing the characteristics of MBIs and providing insights on their rising relevance.

Focussing on specific instruments, Di Santo et al. (peer-reviewed paper 1-017-18) analyse white certificates as a tool to promote energy efficiency in the industry sector, focusing on the Italian mechanism, which was implemented in 2005. The other major white certificate scheme at a national level is examined by Berthou & Paulo (peer-reviewed paper 1-025-18), who present the impacts of the French white certificates scheme on a specific piece of industrial equipment: all-electric injection moulding machines.

Bonduelle (extended abstract 1-117-18) analyse how existing policies could be adapted to include SMEs in a carbon regime to reach ambitious GHG mitigation targets, building upon debates held in the French Social, Economic and Environmental Council (CESE).

Financial support and measures

Financial support offered through different instruments is one of the main policy categories for energy efficiency in the industry sector, and therefore a common focus for evaluation. Voswinkel et al. (peer-reviewed paper 1-035-18) conduct a first evaluation of Germany's waste heat reduction and utilisation programme, which offers subsidised credits through the KfW bank.

A big issue of funding schemes is acceptance by their respective targeted stakeholders. Excessive amounts of paperwork to apply for funding application is seen as an obstacle, imposing high transaction costs on industry. However, there is a need for funding agencies to obtain thorough documentation in order to assess applications and ensure appropriate expenditure of public funds. Radgen et al. (extended abstract 1-036-18) analyse the Swiss ProKilowatt competitive tender programme, where application conditions had been simplified in recent years, giving insights on the implications of these changes.

Financial support is also a major issue when it comes to the demonstration and deployment of new energy technologies. However, funding agencies and other decision-makers often lack transparent and comparable instruments to decide upon which project to fund. Hirzel et al. (peer-reviewed paper 1-111-18) take on the challenge to structure relevant criteria and propose a decision support system for large-scale energy demonstration projects, based on a multi-staged and multi-criteria evaluation process.

In evaluating energy efficiency policies, it is increasingly important that the multiple benefits enabled by energy efficiency are taken into consideration, to provide as complete a picture as possible. Nehler et al. (peer-reviewed paper 1-132-18) map the non-energy benefits enabled by Swedish policy instruments targeting industrial energy efficiency and determine the level to which they are perceived and valued by policy makers, companies and auditors.

Energy efficiency networks

Energy efficiency networks have an extended history both in Europe and internationally, and their value as a means to build capacity and strengthen collaboration on industrial energy efficiency continues to be recognised. Strömvall (extended abstract 1-072-18) examines some of the early results and ex-

periences from the Swedish Energy Agency's national energy efficiency network program for small and medium enterprises (SMEs), this includes the program's methodology and the results obtained by participating companies.

Germany has set an ambitious target of establishing 500 energy efficiency networks by 2020, which highlights its recognition of the potential benefits. Two presentations examine the results and lessons emerging from energy efficiency networks in Germany. Barckhausen & Rohde (extended abstract 1-075-18) detail the results, including savings and investments, for those networks that have completed their first monitoring cycle, including their contribution to the overall savings target for the 500 networks. Durand et al. (peer-reviewed paper 1-100-18) provide further examination of the lessons from the German experience with energy efficiency networks, including barriers and difficulties to establishing networks and how to improve the promotion of networks.

The transposition into national law of Article 8 of the Energy Efficiency Directive has led to energy audits becoming a mandatory requirement for large industrial energy users in the EU. Mai & Gruber (peer-reviewed paper 1-121-18) examine the effects of the energy audit obligation for large companies in Germany, based on the results of a survey of German companies, revealing attitudes to energy audits and energy management.

Future challenges and opportunities

The final theme for Panel 1 reflects the broad variety of future challenges for industrial energy efficiency and the opportunities that are available to policy makers to tackle them. The future for energy intensive industries is a key focus for the first three presentations.

Johansson et al. (peer-reviewed paper 1-014-18) widen the view beyond energy efficiency by discussing climate policy instruments for energy intensive industries such as steel and cement. Moser & Steinmüller (extended abstract 1-055-18) present work on research roadmaps for energy efficiency in the Austrian energy intensive industries, which are based on a stakeholder discussion process. Pan & Lee (peer-reviewed paper 1-085-18) also present insights on policies for energy intensive industries, through analysis of Taiwan's energy efficiency regulations for the paper and cement industries, which are implemented through the definition of maximum specific energy consumption.

Rogers (peer-reviewed paper 1-010-18) examines how strategic energy management programs, which help companies systematically address energy efficiency, can complement and integrate with smart manufacturing support programs, which support the increased application of information and communication technology within industry.

Mallaburn (peer-reviewed paper 1-003-18) collects and analyses evidence regarding what drives energy efficiency in organisations, which can inform policy measures seeking to incentivise energy efficiency actions.

Finally, Hettesheimer et al. (peer-reviewed paper 1-088-18) examine the barriers for developing regulation and product standards for complex industrial equipment and propose a point system based methodology for developing such regulation in future, which will drive efficiency improvements.