

Climate-Energy Policy Approaches for the Industrial Sector

Technical Workshop

January 16, 2015
International Energy Agency, Paris

INTERNATIONAL ENERGY AGENCY

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- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
 - Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
 - Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

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Executive summary

On January 16, 2015, the IEA hosted the Technical Workshop on Climate-Energy Policy Approaches for the Industrial Sector at the IEA headquarters in Paris.

The objective of the workshop was to inform upcoming IEA work by sharing best practices and lessons from country cases, assess policy evaluation methods, and explore recommended actions for governments and industry.

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In the first session, experts from Sweden, Belgium, Germany, and Japan provided an overview of voluntary programs in their countries, focusing primarily on energy efficiency. Speakers in the second session presented frameworks to consider near and long-term policy approaches to reduce industrial emissions and accelerate innovation. Participants also discussed the potential for and limitations of a consumption-based levy.

IEA Work

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Takashi Hattori (IEA) opened the workshop and welcomed participants from Belgium, England, Germany, Japan, Sweden, Switzerland, and the IEA. He briefly described the IEA's recent and upcoming work on climate policy, which led to the workshop objectives: inform upcoming IEA work on this topic by sharing best practices and lessons from country cases, assessing policy evaluation methods, and exploring recommended actions for governments and industry. He provided an overview of industry sector emission shares and trends, actions and challenges, and considerations for policy-makers. [\[slides\]](#)

Ella Rebalski (IEA) introduced the Energy Efficiency Unit's upcoming Policy Pathways publication on accelerating energy efficiency in small and medium sized enterprises (SMEs). She described the rationale, objectives, and contents of the report which includes over 20 case studies. The publication is undergoing external review and will be released this fall. [\[slides\]](#)

Lessons learned and best practices: Climate change policy measures in industry

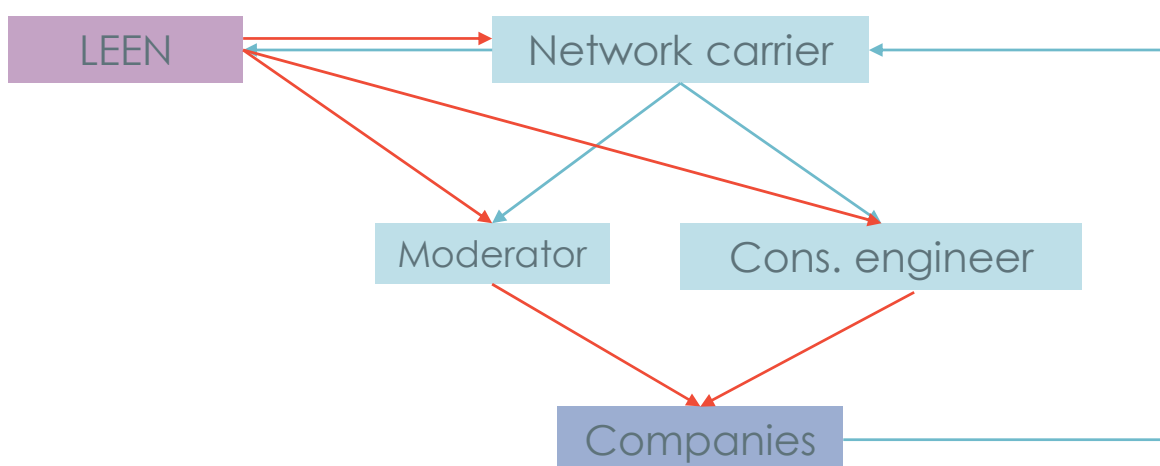
Patrik Thollander from Linköping University shared Sweden's experience, where there are a number of policies to improve energy efficiency in industry. Patrik highlighted results from two voluntary programs: Programme for Energy Efficiency in Energy-Intensive Industries and the Energy Audit Program, which encourage participation through a reduction in the price of electricity. Further progress on efficiency requires a combination of supply, technology, and process management measures. [\[slides\]](#)

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Erwin Cornelis from VITO (Flemish Institute for Technological Research) shared Belgium's experience with voluntary agreements in industry. Energy efficiency and renewable energy generally fall under regional jurisdiction in Belgium (Flanders, Wallonia, and Brussels). Efficiency targets are met primarily through voluntary agreements, formerly through Benchmarking and Auditing Covenants, and more recently, through Energy Governance Agreements. Results to date suggest policy makers should carefully consider firm characteristics (e.g. smaller, less energy-intensive firms achieved higher improvement in energy efficiency) and the choice of metrics (e.g. intensity vs. absolute) when developing and implementing voluntary agreements. [\[slides\]](#)

Clemens Rohde from Fraunhofer ISI focused on industrial energy efficiency policy in Germany, where industry accounts for one-third of total energy demand. Energy-intensive industries can apply for tax exemptions if they sign a voluntary agreement to improve energy efficiency and introduce an Energy Management System (EMS, e.g. ISO 50001); these exemptions totalled EUR 9.2 billion in 2012. Learning Energy Efficiency Networks (LEEN) can facilitate EMS implementation, where participating companies share information to save energy (Figure 1). 30 pilot networks representing energy cost of approximately EUR 1 billion per year have achieved an average efficiency improvement of 2.2% per year. Smaller firms that do not qualify for tax reduction schemes are covered by other incentive programs. [\[slides\]](#)

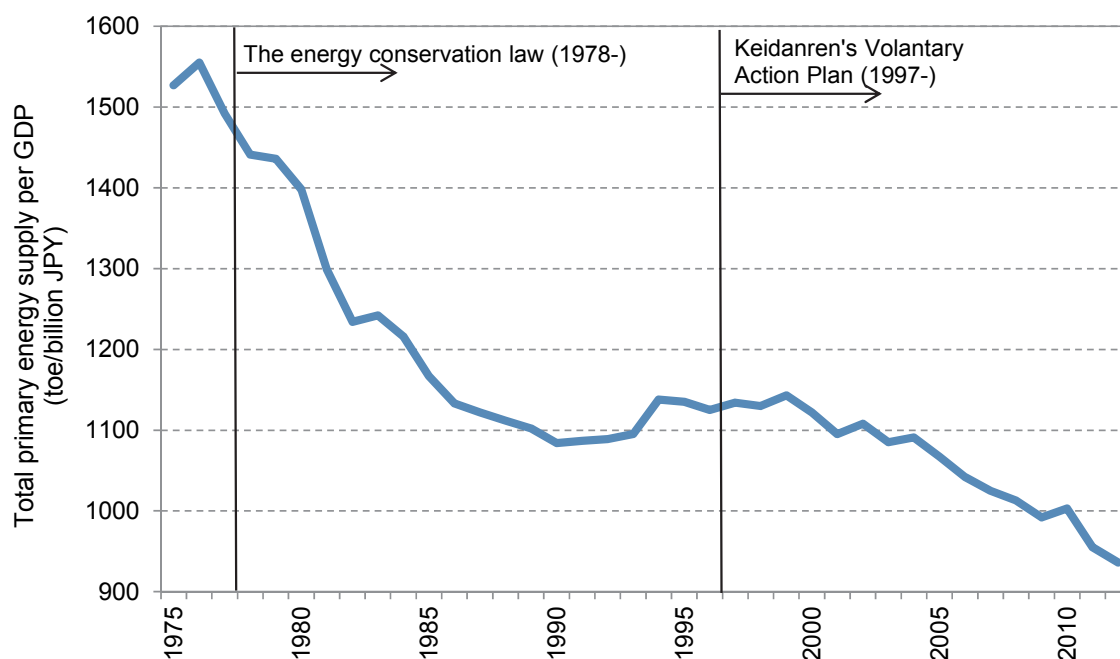
Figure 1 • Learning Energy Efficiency Networks to promote Energy Management Systems (EMS)



Source: Rohde, C. (2015). "Climate change policy measures in industry: the example of Germany."

Keigo Akimoto from the Research Institute of Innovative Technology for the Earth (RITE) shared results from Japan's Keidanren Voluntary Action Plan (VAP), which covers 84% of industrial sector emissions (Figure 2) He highlighted some key lessons, including the importance of the Plan-Do-Check-Action (PDCA) Cycle, role of business/industry associations, and issues with intensity-based vs. absolute targets during periods of lower production (e.g. recession). He also discussed the challenges of assessing the effectiveness of such programs. [\[slides\]](#)

Figure 2 • Energy intensity in Japan: 1975-2012



Source : Akimoto, K., Tokushige, K., Oda, J., Sano, F., Homma, T., Wada, K. (2015). "Overview of the Voluntary Action Plan in Japan and Quantitative Analyses on the Emission Reduction Efforts"

Discussion:

- Some policies in Western European countries have been cancelled or phased out due to incompatibility with existing European Commission trade law. At the same time, new voluntary agreements for industrial energy efficiency have emerged in a number of Eastern European countries (Figure 3).
- Policy makers face challenges in program evaluation, such as estimating the relative impact of various policy instruments. This challenge is managed in Germany and Belgium where there is relatively low overlap between ETS and voluntary programs. Policy makers should look to fine-tune policy instruments to minimise overlap. Estimating free-ridership is also difficult. In Sweden, company questionnaires may be used to assess free-ridership. In Germany, companies outside of the program networks were used as counterfactuals for comparison. It was found that there was two times more uptake of energy efficiency measures for those inside the program than those outside.

Figure 3 • Status of voluntary agreements on energy efficiency in industry in Europe



Note: Red indicates stopped; blue indicates operational; green indicates new.

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

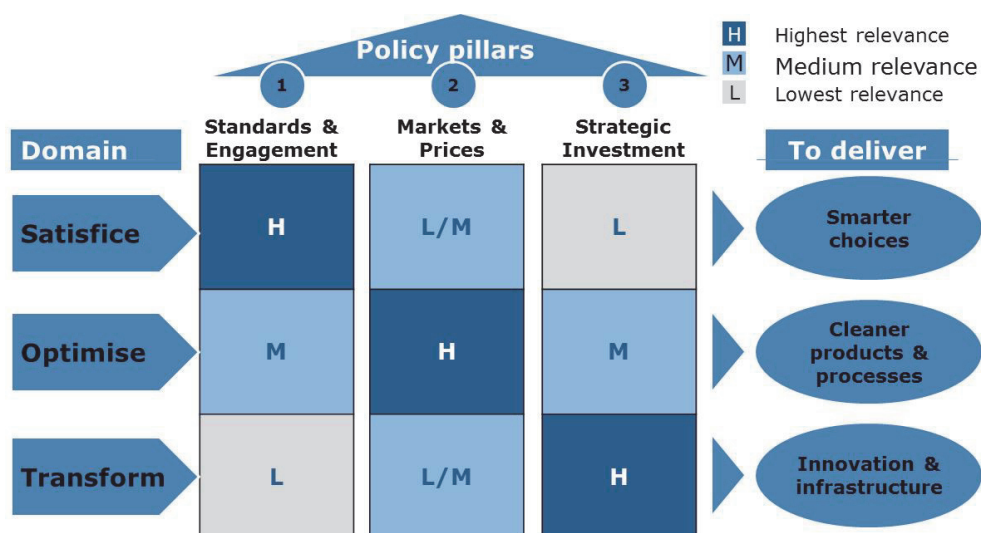
Source: Cornelis, E. (2015). "Technical Workshop on Climate-Energy Policy Approaches for the Industrial Sector: BELGIUM"

Considering further approaches for climate change policy measures in industry – the role of regulation, market and voluntary approaches

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Michael Grubb from University College London and Ofgem provided a higher level perspective on policy approaches by introducing a conceptual framework that integrates the “Three Domains” and the “Three Pillars of Policy.” The Three Domains pertain to different domains of economic behaviour, while the Three Pillars correspond to different policies in three portions of the abatement cost curve. Behavioural changes in all three domains are necessary for addressing climate change, and this framework can assist in selecting appropriate policy options for each domain (Figure 4). For example, the use of standards and engagement (e.g., information campaigns) in Pillar I could incentivize ‘satisficers’ in Domain I (e.g. appliance and equipment buyers) to purchase energy-saving options. A significant proportion of ‘slightly cost effective’ abatement opportunities (Domain II) are related to industrial energy efficiency. The most energy intense sectors (cement, refined petroleum, steel, etc.) require special attention. Key opportunities may exist outside of the production process (e.g. recycling). Prof. Grubb identified other issues, including use vs. embodied energy and emissions, and low R&D intensity in high emission industrial sectors. He highlighted the need for policy integration and understanding complementary roles of different pillars. [\[slides\]](#)

Figure 4 • Solutions need to harness corresponding policy pillars

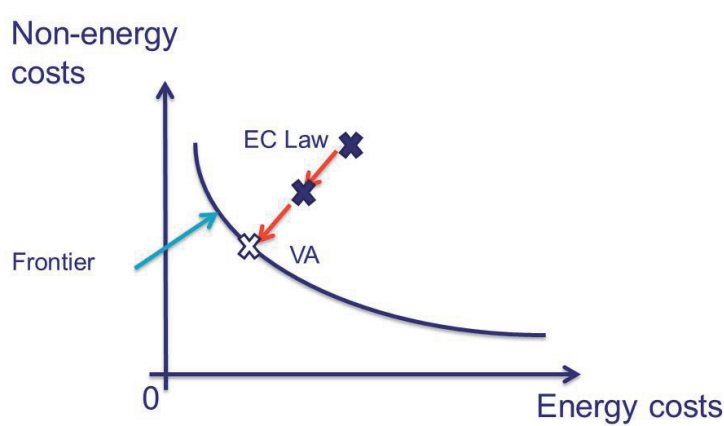


Source : Grubb, M. (2015). "Policy approaches in Industry."

Karsten Neuhoff from DIW Berlin discussed the challenges of addressing carbon-intensive industries and potential leakage concerns of policy tools, and introduced the idea of a consumption-based levy. For example, the steel sector may achieve 10-20% savings through energy efficiency and process improvements, but breakthrough technologies (e.g. CCS) are required to achieve deep emission reductions. He introduced the idea of a domestic consumption levy (similar to alcohol or tobacco taxes) to create incentives along the value chain – which are diluted under an ETS with free allocation – in order to reduce emissions and avoid leakage. [\[slides\]](#)

Taishi Sugiyama from the Central Research Institute of Electric Power Industry (CRIEPI) used the Three Domains and Three Pillars frameworks to discuss policy approaches in Japan, focusing on voluntary actions. With already high energy prices, the effectiveness of regulatory approaches (e.g. Energy Conservation Law) is approaching saturation in Japan. Voluntary actions can be a sensible policy option to move firms even closer towards the optimal efficiency/productivity frontier (Figure 5), given that laws typically move firms to some minimum standard. He stressed that voluntary actions are best implemented as part of policy packages -- along with laws, taxes, etc. The presence of strong institutions (e.g. industry associations) and auditing mechanisms (PDCA cycle) have contributed to the success of voluntary actions in Japan. Social responsibility/expectations are also key drivers of voluntary action. [\[slides\]](#)

Figure 5 • Voluntary action (VA) and the frontier



Source : Sugiyama, T. & Wakabayashi, M. (2015). "Role of VA in Japanese policy package."

Discussion:

- The most effective voluntary actions move firms towards the efficient frontier; they are flexible and interact with other pillars/actions.
- A consumption-based levy could have undesirable or unintended side effects (e.g. deplete capital that takes away from R&D/innovation). These revenues could potentially be recycled to fund innovation and competitiveness. Are some industries better suited for this (e.g. concrete), or can this be implemented across all industries?
- Since energy efficiency can only achieve ~20% of reductions in many industrial sectors, governments and industry must find ways to accelerate innovation.
- Shifting norms by engaging educational institutions could achieve some savings - e.g. engaging architects and engineers to shift building 'norms'.

Conclusion and next steps

Takashi Hattori and **Hiroki Kudo** thanked speakers and participants for their contributions to an informative and fruitful discussion. Takashi identified next steps, including the drafting of this summary report and further engagement with industry experts on the IEA's upcoming work in this area.



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