

12th  EU Hitachi
Science & Technology
Forum
2010



**Smart energy
usage for a
sustainable society**

7th May 2010, Brussels

SUMMARY REPORT

100th ANNIVERSARY
Celebrating 100 years of the Hitachi Group

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Executive summary

Around 150 participants met in Brussels on 7th May 2010 for the 12th EU Hitachi Science & Technology Forum. The meeting attracted a diverse range of technologists, industry leaders, researchers and policy-makers who assembled to debate the issue of Smart Energy Usage for a Sustainable Society.

The Path to Zero Emissions

Despite the inconclusive outcome to the Copenhagen Summit, climate change is still high on the political agenda. It is a major element in the European Commission's Europe 2020 strategy which sets out a path for smart, sustainable and inclusive growth in Europe. The EU's Climate and Energy policy package – including the so-called '20-20-20' targets – amounts to an ambitious policy approach which will require the implementation of substantial energy efficiency measures. Energy efficiency and sustainability also feature as one of the main societal challenges to be addressed by ICT under Europe's Digital Agenda. For companies, too, a low-carbon economy is an important business driver: rising energy and emission costs make it cost-effective to cut emissions, while green solutions can be a source of innovation and open up new markets.

Forum speakers emphasised that 'zero emissions' is not an abstract concept. On the contrary, researchers and thinktanks have charted the path towards a zero- or low-carbon economy in great detail over recent years and have shown in concrete terms how this could be achieved and what steps need to be taken. The challenge now is to realign the economic and social systems towards zero emissions. The Forum heard many practical examples from companies and sectors in how they are starting to bring this about. Energy efficiency is an essential component of a zero emissions policy. It can contribute to all the main goals of energy policy – economic growth, energy security, and environmental protection – and has shown sustained improvement over many years. Improved energy efficiency is the single most important option to reduce CO2 emissions in the future, accounting for around two-thirds of the abatement necessary by 2020. Measures are often low cost and relatively quick to implement; they can buy time for less mature technologies to be developed. The Forum observed that existing barriers could be overcome by effective energy efficiency policies and called for a concerted and immediate implementation effort worldwide.

Technologies and Markets for Smart Energy Usage

The Forum noted three areas with significant potential for energy efficiency improvements and CO2 reductions policies to drive investments in a low-carbon society:

- Electricity distribution and use has the potential to yield major reductions, some of which could be realised within a relatively short period. Homes and office buildings, in particular, have significant room for improvement. Better



management through smart grids, for example, can cut demand by up to 15%, simply as a result of consumers learning more about their energy usage.

- Transport is essential to the decarbonisation of the economy. It is the most rapidly growing source of CO2 yet is also the sector most resistant to abatement measures. The full arsenal of measures will need to be employed, from technology improvements (such as better engine and vehicle design, and low-carbon fuels), to others concerned with avoiding emissions and shifting patterns of transport use (such as road pricing, car clubs, and route planning). The widescale rollout of electric vehicles would have a significant impact not only in transport but also in the energy sector where they could become sources, as well as users, of power.
- For the longer term, urban planning will play a major role. We must design cities for higher density living and in such a way that mobility needs are fully taken into account – either using fully integrated public transport or avoiding the need to travel altogether.

The Forum noted that what happens in the transport sector is key to the overall outcome. Electricity can substantially reduce CO2 emissions from transport and could eventually account for a substantial share of fuel used in the transport sector (from 2% in 2005 to 63% in 2050). This could be achieved without any net increase in electricity production provided we can realise more efficient use of the network overall. In the meantime, strong support is needed to develop a market for electric transport.

Much of the necessary technology is already available. Although further research is still required in some areas, there is already a wealth of technological solutions that can help us on the road to zero emissions. Hitachi itself is actively involved in many of these markets. Ensuring large-scale adoption of the technologies remains a major challenge, however.

Policies for Smart Energy Usage

Policy-makers have many tools at their disposal. On the supply side, there are the usual measures such as regulation and standards, guidance, and support for R&D. Demand-side measures (e.g. standards, labelling, incentives, and best practice) can influence users' behaviour; they should encourage and incentivise rather than be burdensome. Thirdly, international collaboration is important in reaching globally-agreed solutions and ensuring a level playing field.

Session 1: Keynote

Mapping the Path to Zero Carbon Emissions:

Prof. Jacqueline McGlade, Executive Director, European Environment Agency



Prof. McGlade thanked Hitachi for the invitation to speak at the Forum and was interested in meeting such a diverse audience. 'Zero emissions' is not an abstract concept, Prof. McGlade maintained. Last summer the G8 had announced the objective to reduce emissions by 80% by 2050 and it is possible to plot fairly precisely the milestones that need to be achieved to realise such a goal. The European Climate Foundation, in its recent Roadmap 2050 report, noted that: "Achieving the 80% reduction means nothing less than a transition to a new energy system both in the way energy is used and in the way it is produced." This is not just about doing things in more efficient ways but reviewing how we meet our needs in various fields.

The European Environment Agency (EEA) has done extensive work on the co-benefits of emissions reductions, including benefits for health. Business also reports good potential coming from wise investments in efficiency markets. According to International Energy Agency (IEA) estimates, energy efficiency measures could reduce global emissions by 8Gt of CO₂/yr by 2050, which is more than the entire reductions aimed for by the EU. Other research by McKinsey Global Institute shows cost savings of more than €50 per tonne of carbon equivalent for relatively simple measures such as insulation improvements, fuel-efficient vehicles, and better lighting systems, water heating and air conditioning. Transport will be in the vanguard of this new, more resource-efficient world. A recent report by the EEA tracking transport

and environment indicators for the EU notes that: '...if ambitious targets are to be achieved, policymakers will need to employ all measures rather than just picking the best ones.' We have to combine measures designed to improve emissions (such as better engine and vehicle design, and low-carbon fuels) with others more concerned with avoiding emissions and shifting patterns of transport use (such as road pricing, car clubs, increasing population density in cities, and travel planning). So, for instance, we might need to think in terms of providing 'mobility services' rather than car ownership.

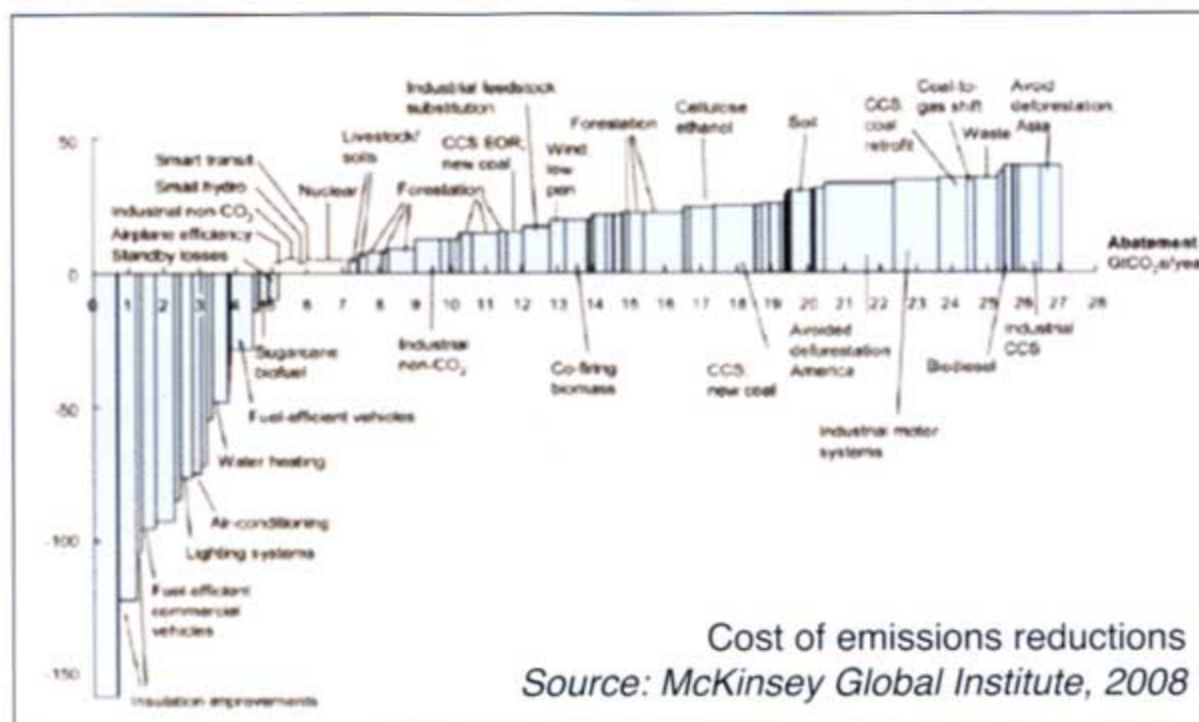
Some of the biggest gains are in urban planning, designing cities in such a way that mobility needs are taken into account from the beginning. "The debate on infrastructure should be at the beginning of the discussion, not the end", Prof. McGlade explained. In Europe, 75% of people live in cities and there are many successful examples of such planning here and around the world.

Turning to energy usage, Prof. McGlade noted that better management through smart grids can cut demand by up

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to 15%, simply as a result of consumers learning more about their usage. Some people and interest groups are still resistant, however. In the UK, for example, the building trade has been shown to be an obstacle, since companies say they do not have the skills and equipment. Consumers and consumer groups are becoming more savvy and exerting pressure on suppliers. The EEA has been working with Microsoft Inc. to make information on efficiency gains more widely available to consumers through data clouds. In addition, it has reduced its own energy consumption for satellite transactions (one of its more energy-intensive processes) by 15% in one year.

In conclusion, EEA sees its role in mapping the path to a low-carbon economy as being to deliver information to citizens, businesses, policy-makers and consumers in the most efficient way possible. As well as extensive partnering within Europe, it collaborates internationally with partners such as the US Environmental Protection Agency. Recent experience with the volcanic ash cloud and snow problems with trains show there is plenty of room for some 'blue sky thinking' on how we live our lives.



Session 2: Panel presentations

Key Technologies to Move to Zero Carbon Emissions by 2050

Session moderator: Dr. Jean Freymond, President & Director, Geneva Dialogues (D@G)



This session, and the remainder of the Forum, was moderated by Dr. Jean Freymond, Director, D@G - Geneva Dialogues. It aimed to address three questions: What are the currently available technologies? What are the challenges still facing the different sectors? And what are the technology developments still required?

Introducing the speakers, Dr. Freymond emphasised that technology is only part of the answer and has to be accepted by people. The recent UN report on Energy for a Sustainable Future (available on the Forum website) estimates that transforming the global energy system would cost \$1 trillion per year. Governments alone cannot do this: we consumers – as actors within the market – are in charge and we cannot afford to waste money.

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(UN report on Energy for a Sustainable Future, link available on: www.hitachiforum.eu)



Integrated Transport in Curitiba Source: Pierre Laconte



Construction and Urban Development Sectors Mr. Pierre Laconte

President, Foundation for the Urban Environment, Past-President, International Society of City and Regional Planners

Research shows a clear correlation between gasoline consumption and the density of urban environments. In US cities, for example, consumption per person is typically three to five times higher than in European cities, while the density of urban development is considerably lower. Japanese cities have even higher density living and many people are returning to central Tokyo to live. The low densities observed in the US are the direct result of the motor car, with little priority being given to public transport. An investigation by the European Commission's Joint Research Centre shows urban sprawl is increasingly apparent in Europe as well.

Cars are a very inefficient means of consuming transport. They are left parked for 80% of the time or more, during which they amount to 'dead space' in economic terms. There are many examples of cities that are aiming to tackle this problem. In the South American city of Curitiba, for instance, the city authorities have specified legal limits on the density of development and are also investing in public transport (Figure 6). The Swedish city of Göteborg has a plan to eliminate fossil fuels by 2050. And Heidelberg in Germany aims to be the first 'zero-emission' city district in the EU. Among measures being adopted, it has launched a fifteen-year programme to build passive housing, and will be the first user of trams fitted with so-called 'supercap' technology.

"Buildings are the powerhouses of the future", Mr. Laconte argued. If we are to realise the potential from technologies such as wind and thin-film photovoltaic, we need to invest to implement these technologies in buildings. Experience shows that the price curve for such technologies drops considerably once they enter widescale deployment.