

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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Foreword



It is my great pleasure to present the summary of the proceedings of the 12th EU Hitachi Science & Technology Forum on “Smart Energy for a Sustainable Society”, which was recently held in Brussels. Approximately 150 participants from both Europe and Japan attended this year’s Forum, which was also an opportunity to celebrate the 100th anniversary of Hitachi, founded one century ago in 1910.

The main objective of the EU Hitachi Science & Technology Forum is to contribute to the public policy debate in Europe by providing a platform for discussing societal issues related to science and technology in the daily life of European citizens.

This year’s Forum theme on Energy Efficiency was very topical. It is clear that reducing energy consumption, whilst maintaining or increasing the level of comfort and services for society, is one of the major routes to combat climate change. It is also an effort in which everyone, whether individual citizens, industry leaders or government officials, can make a difference by their actions. At Hitachi, we believe that future economic activity must be conducted on the premise that the earth’s environment has limits. If society as a whole adopts a new sense of values that recognise these additional constraints, we can look forward to a prosperous future.

Hitachi itself is making many efforts to reduce its carbon footprint, not only during the manufacturing process of its products but also through the reduction of its products’ energy consumption during their lifecycle. Through its focus on societal infrastructure for the transport, energy and ICT sectors, Hitachi strives to help make society more energy efficient.

During this 12th Forum, we had valuable discussions on energy policy issues and technology in three sectors - Construction & Urbanism, Logistics & Transport, and the Energy sector itself. The Forum attendees then split into three groups to discuss the topics of Individual Users’ Behaviour, Industrial Users Behaviour and the impact of ICT on Energy Efficiency.

I would like to thank to all speakers, moderators, Forum members and all other participants for their contribution to this year’s Forum and I hope that you will find this report interesting and that it will further contribute to the discussion on energy efficiency in Europe.



Sir Stephen Gomersall
Chief Executive for Europe



A platform dedicated to promoting dialogue between European citizens and decision-makers.



Presentation by Mr. Nobutake Odano, Ambassador, The Mission of Japan to the European Union, at the reception in the Belgian Comic Strip Center on Thursday 6th May.



The Forum

The EU Hitachi Science & Technology Forum is a platform dedicated to promoting dialogue between European citizens and decision-makers. It brings together professionals from a wide range of sectors and backgrounds to discuss societal issues related to science and technology in the daily life of European citizens. Since its launch in 1998, annual meetings have been held at locations across Europe on topics relevant to the European policy debate. Participants are European scientists, engineers and

business-people who have all participated in long-term internships at Hitachi laboratories or plants in Japan, together with representatives from Hitachi's businesses in Europe and invited guests and experts.

The Forum has two objectives. Firstly, it provides a platform to address and discuss societal issues related to science and technology in the daily life of European citizens. Secondly, it provides an occasion for Forum members to network with friends and colleagues.

Pierre E. Longin: EU Hitachi Science & Technology Forum Fellow



In Memoriam

In 1997, Mr. Pierre Longin launched the idea that Hitachi gather former European trainees to Hitachi Laboratories in Japan and organise a debate between them and selected high level speakers and moderators on the impact of Science and Technology on European society. After only a few months of preparation, the first gathering was held, in Juan-les-Pins, France in 1998. The EU Hitachi Science & Technology Forum was born.

Over the next few years the Forum was fine tuned and improved. Mr. Longin then had the idea to have the summary of the discussion compiled, printed and sent to as many decision-makers and stakeholders in Europe as possible, in order for Hitachi to contribute in a concrete way to the European public policy debate. This was to be the beginning of the Forum Report publication and distribution.

In 2001, he suggested that, to further improve the quality of the Forum debate, Hitachi should appoint a small group of advisers who could help in defining the agenda of the Forum and in selecting high level speakers and moderators; the Forum fellowship was created and Mr. Longin was of course appointed as Forum fellow.

From the above text it is clear that Mr. Longin is in a sense "Mr. Forum" as without his ideas and creativity this now well established event would never have sprung to life and would certainly not have survived the test of time. Through his extensive network of contacts he has also been able to get a variety of high level speakers and moderators to attend the Forum.

French by birth and European by conviction, Mr. Longin was also a passionate lover of the arts. He loved reading historical books and often went to antique house sales and more often than not would walk out with a hidden treasure at a fraction of the price. Painting, opera and classical music were also part of his eclectic mix of interests. He was also a very proud father of three sons and a daughter and of course enjoyed spending time with his numerous grandchildren. Basically Mr. Longin had boundless energy and he loved life, anyone who got to know him personally can not have helped but be swept away by his boundless energy, intellectual capacity and generosity.

Mr. Longin attended the 12th EU Hitachi Science & Technology Forum in Brussels on 7th May and passed away a few days later. This 12th Forum will therefore be the last memory that most of us will have of seeing Mr. Longin.

All of the people involved in the Forum over the past years will greatly miss Pierre Longin and his absence at subsequent Forums will leave a big void.

This report is therefore dedicated to the memory of Mr. Pierre Longin.

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.

Opening remarks

Sir Stephen Gomersall, Chief Executive for Europe, Hitachi



End-user industries should make improving their energy and carbon performance a high-level commitment and establish board-level strategies to enhance brand value and claim first-mover advantage. Pressure from customers, investors and competitors (e.g. performance rankings) can all be instrumental in encouraging companies to take the necessary actions. Once the momentum for change has been created it could be maintained by the use of dynamic targets to keep raising the bar over time.

Forum speakers emphasised that **‘zero emissions’ is not an abstract concept.**

In relation to individual users, the Forum emphasised that changing behaviours will require a combination of public policy and market drivers. Price can be used both as an incentive to reward good behaviour and as a disincentive to discourage bad behaviour. However, price alone is not enough: users also need information – for example in the form of labelling schemes and case studies – that empowers them to make appropriate decisions either as citizens or consumers (recognising that the two are not necessarily the same). Other potential levers for changing behaviour include: education on the role of ‘smart’ technology and of monitoring energy usage; better consumer product information; and shifts in the public debate and creating new social norms. Many of the solutions rely on the use of advanced ICT and it is clear that the ICT industry will play a key role in the energy efficiency market going forward. Developments such as smart grids, smart cities and buildings, and smart transportation and logistics have the potential to realise major reductions in emissions, and in so doing transform the sectors concerned. Developments are at an early stage and the business models are still not clear. The ICT sector needs to work more closely with others in order to set out these models and define more precisely the benefits of the ‘smart’ versus the ‘old’ way of doing things.

The Forum stressed that industry needs stability and to know the direction of travel. For large projects, especially, the private sector requires a framework and government should do more to lead the debate and secure public acceptance. However, the Forum concluded that we cannot rely on governments alone here: they are unlikely to be able to implement the necessary frameworks in time. Leadership instead must come from the local level. Cities and local/regional administrations will be key to driving forward policies and as partners for businesses and individual citizens. Collectively, Europe and Japan have a major part of global leadership, both in technology and in visionary thinking, and there are many opportunities for collaboration.

Sir Stephen welcomed participants to the Forum and offered his thanks in advance to the moderators and speakers. The topic of this year’s event was an important one: how new technology in the area of energy production and use can influence and help support a truly sustainable society. Energy is always with us and the issues are not so long term as we like to think. Important decisions have to be taken today. The Earth’s societies and systems have limits and technology corporations like Hitachi have a vital role to play in enabling a more sustainable society and therefore a safer and more prosperous future.

“Why has Hitachi chosen this topic?”, Sir Stephen asked. Whilst the outcome of the Copenhagen Summit last December had been disappointing, the importance of emissions reduction will not disappear. On the contrary, although it may take longer to reach agreement on climate policy than many had hoped, Europe has to continue to lead in emission reductions technologies and the application of those solutions. Europe’s 20-20-20 targets have achieved wide recognition, as have similar commitments by Japan. Global corporations also see best practice and eco-innovation as an important element of competitiveness. However, there is still a long way to go internationally and within Europe in terms of reaching consensus on the best policies and mechanisms for achieving these ambitious reduction targets. The Forum would be a contribution to that debate.

Hitachi offers a variety of energy solutions in Europe, from thermal power plant engineering to innovative energy transmission and control products, and the Forum would be hearing more about these.

It was two years since the Forum last met in Munich. This year’s event had a number of innovations, Sir Stephen explained, allowing participation of Hitachi stakeholders as well as Forum Fellows. He encouraged everyone to contribute to the debate and hoped it would spark new thoughts on the lives of citizens.

Session I: Panel presentations

Policies towards Energy-Efficient End-Use and Energy-Efficient Technologies

Session moderator: **Mr. Jason Anderson**, Head of European Climate & Energy Policy, WWF European Policy Office



Dr. Peter Taylor
Head of Energy Technology Policy Division, International Energy Agency

Dr. Taylor offered some reflections on the potential of energy efficiency in reducing emissions and past trends. In the period between 1973 and 2006, global energy usage grew by approximately 20%; without energy efficiency improvements the hypothetical use would have been some 63% higher. However, improvements have slowed since 1990, from around 2% per year to around 1%.

Turning to the future position, energy efficiency has an important part to play. Efficiency measures account for around two-thirds of the 3.8Gt of abatement needed in 2020, with renewables contributing close to one-fifth (Figure 2). It continues to account for more than 50% of the required abatement through to 2030. In an analysis of energy efficiency recommendations across seven sectors, IEA found that no country had effectively implemented more than 57 % of the relevant recommendations. These recommendations are not novel; all have been implemented somewhere in IEA member countries. Furthermore, Europe's record here is not good: only the UK is in the top four countries in terms of implementation and all of the bottom six are European.

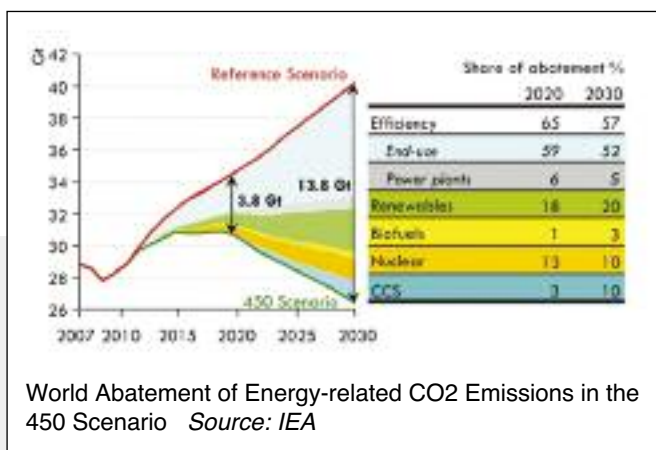


Mr. Takayuki Sumita
Executive Director, Japan Machinery Center for Trade and Investment - Brussels Office

Mr. Sumita outlined policies for energy efficiency end-use based on experiences in Japan. Energy efficiency is an effective policy target, Mr. Sumita explained, because it impacts on the whole economy and society and has high potential for delivering improvements. An effective implementation relies on a combination of new cutting-edge technologies and traditional technologies. Analysis by Japanese agencies shows the residential and office sector has the greatest room for improvement – a situation that is repeated in other industrialised countries.

Policy-makers have many tools at their disposal. On the supply side, there are the usual measures such as regulation, guidance, and support for R&D. Demand-side measures (e.g. standards, labelling, incentives, best practice) can influence users' behaviour; they should encourage and incentivise rather than be burdensome. Finally, international collaboration is important in reaching globally-agreed solutions. In Japan, a 'Smart Energy Label' is now included on every home appliance. This presents the consumer with an array of useful and easy-to-understand information, such as: efficiency (based on a five-star rating), an overall efficiency (in %), and electricity consumption in kWh per year.

Most importantly, the label has the monetary value of the electricity used per year. Another innovation from Japan is the eco-point system introduced in 2009, which gives incentives to people to buy the most efficient products. Best practice is also a useful tool: for instance, the Windsor Hotel in Japan, venue of the G8 summit in 2008, reduced its total electricity consumption by 21% by following best practice measures.



World Abatement of Energy-related CO2 Emissions in the 450 Scenario Source: IEA



Mr. Piotr Tulej

Head of Unit, Low Carbon Technologies, DG Climate Action, European Commission

The new Directorate-General shows the Commission’s commitment to combatting climate change, said Mr. Tulej. Commissioner Connie Hedegaard has stated that her ambition is to see, in five years’ time, a Europe that is the most climate friendly region in the world. The targets included in the EU’s Climate and Energy Package already imply ambitious energy efficiency goals and in fact require implementation of substantial energy efficiency measures. Europe is already making major strides with regard to energy efficiency, Mr. Tulej explained. Incandescent bulbs are now virtually eliminated in the EU, and the Commission is looking at other measures such as improving the efficiency of motors, etc. European Economic Recovery Programme monies will also be available for energy efficiency, but the EU will not stop there. Climate change is a major element of the Commission’s Europe 2020 strategy, which sets out a path for smart, sustainable and inclusive growth. There is also the Digital Agenda, where energy efficiency features as one of the main societal challenges to be addressed by information and communication technology (ICT). The Commission is working on a roadmap for the low carbon economy by 2050, which will show the way towards decarbonisation of the European energy sector. Many DGs are involved in this work and DG Climate Action has a major input.

The Commission will publish a communication on energy efficiency strategy during the second half of 2010. This is likely to include a review of the 2006 Energy Efficiency Action Plan, recognising that we now have much in place but have to work harder on the efficiency of products and buildings, and in introducing ICTs into the system. All of this will, of course, be undertaken in close collaboration with the Member States under the Europe 2020 strategy.

“A dialogue between industry and the Commission, today and later on, will help us to get there together”, concluded Mr. Tulej.



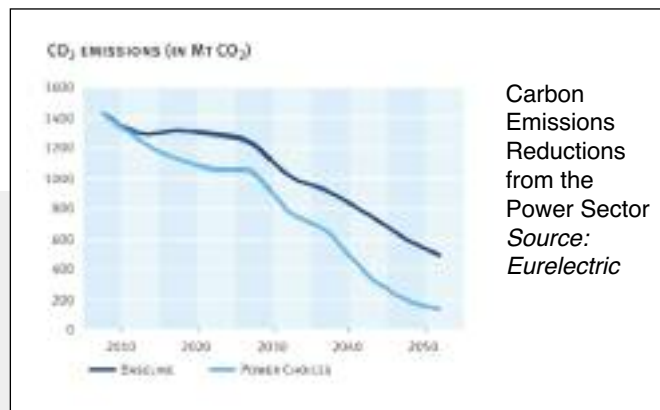
Mr. John Scowcroft

Head of Unit, Environment & Sustainable Development Policy, Eurelectric

Europe’s power sector has a very clear view on the path to zero carbon emissions, explained Mr. Scowcroft. At a meeting in March 2009 under the auspices of Eurelectric, CEOs committed to: a carbon-neutral power sector by 2050; cost-efficient and reliable supply through an integrated market; and energy efficiency and electricity use as solutions to mitigate climate change. A roadmap – entitled Power Choices - has subsequently been produced and a full report will be available shortly.

Eurelectric’s analysis assumes (among other criteria) that there will i) be no binding target for renewable energy supplies (RES) post-2020; and ii) the CO2 price is the only driver for low-carbon generation post-2030. Under these assumptions, there is an overall decrease in energy demand. This is despite a “paradigm shift” to efficient electric technologies – while there is more use of electricity, there is less energy used overall.

Under this scenario, carbon emissions from the European power sector fall by 90% – from 1423 MtCO2 now to an estimated 128 MtCO2 by 2050 (Figure 4). This will effectively decouple energy demand from CO2 emissions. The majority of these deep cuts take place between 2025 and 2040 – but to achieve this investments are needed now. “2020 is in the rear view mirror as far as the power industry is concerned”, explained Mr. Scowcroft. “We are investing now for plants that will be on stream for 2025”.



Panel discussion

Mr. Anderson asked the panellists whether they thought existing policies were well placed to deliver the necessary reductions. Prof. McGlade said it was clear from the presentations that we needed to be more precise in the language we use in relation to reductions – for instance, distinguishing better between energy efficiency, carbon efficiency, and resource efficiency. We have the means to implement personal carbon accounts and should do so. And we need to improve and be more precise about labelling – at present there are around 150 energy labelling schemes in Europe. Resource efficiency requires that we couple carbon targets with those for water and other resources. Mr. Taylor agreed that we need to be more precise in our definitions. In broad terms, ‘energy efficiency’ means providing the same service with less energy input.

Another Forum attendee asked whether the 20% emissions reduction target was ambitious enough given Europe’s capabilities. Mr. Tulej replied that it was. The EU’s Climate and Energy package had been hard won but Member States had eventually agreed. As the presentations had shown, countries still have a long way to go in implementing even existing measures. The EU’s 30% target for the EU was announced at the time as pending international negotiations. Mr. Scowcroft said the power sector would reach the 20% target, but the issue was burden-sharing. At present, the sector is bearing a disproportionate share of the effort in decarbonising the economy because of inconsistent policies by Member States in areas such as transport and agriculture.



In broad terms, ‘energy efficiency’ means providing the same service with less energy input.





Session 2: Keynote

Leading Social Innovations by Information and Control Systems Integration

Dr. Akira Maeda, Chief Technology Officer, Information & Control Systems Company, Hitachi Ltd.



Dr. Maeda explained that Hitachi focuses on innovation for a better society by creating value through total integration. Power and industrial systems and ICT are major markets for the company and have been identified as growth engines over the next 20 years.

In terms of Hitachi's contribution to environmental performance, its Environmental Vision 2025 plan aims to reduce CO2 emissions by 100 million tonnes per year globally by 2025. This will be achieved through a wide range of environmentally-superior eco-products and the strengthening of its environmental businesses. There are many issues on the path towards a 'low-carbon society', such as: how to accommodate diverse power sources and demand patterns; ensuring the social infrastructure is reliable and dependable; and providing compatibility while also keeping costs down. Hitachi has many technologies that are helping to meet these requirements. New smart power generation technologies include low-emission coal-fired power plants and wind farm control systems that optimise outputs from a whole group of turbines rather than individual generators. In the area of smart grids, the company is looking at distributed management systems for energy resources. It aims to lead the market in power storage using traditional lead-acid batteries, as well as in the development of the next generation lithium-ion batteries. In smart energy use, innovations include variable speed drives for electric trains, and modular data centres that are more energy efficient.

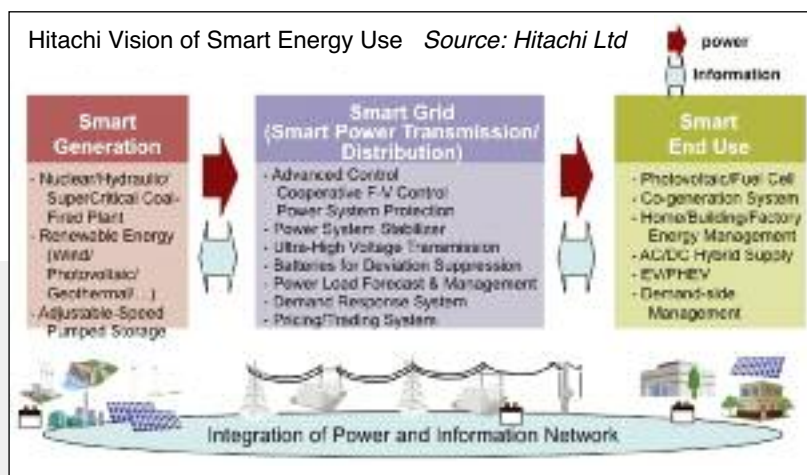
"Why is ICT important for social innovations?", asked Dr. Maeda. There has been explosive growth in ICT over the last 20 years but improvements in social infrastructure have been far slower. Yet there is an urgent and growing need for 'smarter infrastructure' to tackle challenges such as poverty, food, ageing, and environment. ICT has changed the world of information: the next target should be physical infrastructures such as logistics, energy, water, transportation, food, and health. Key issues are how to exploit the vast array of real-world/real-time data and to provide real-time feedback to physical systems.

In traditional information and control systems, data has flowed upwards, from sensors and controllers, allowing the system to be connected and visualised. The next phase of intelligence and optimisation required that data also flowed across, creating new applications and collaboration of multiple applications. This facilitated aspects such as demand-side management and asset management and maintenance.

"Hitachi focuses on innovation for a better society by creating value through total integration."

The next stage in system evolution will be towards integrated/unified control, where data flows in both directions and there is real-time feedback within the system. Integrated control is extremely demanding technically, requiring a 'system of systems' approach, a highly reliable ICT platform, and sophisticated back-end systems for knowledge creation. Hitachi has a concerted programme to realise such solutions, based on three elements: distributed system technologies; reliable/dependable ICT platform; and a Knowledge as a Service (or 'KaaS') architecture.

Hitachi is well placed to be a best solution partner for the social innovation business. It has long experience and track record in system construction, a wide spectrum of products, cutting-edge technologies, and total lifecycle service offerings. It aims to be open, global and local and has already joined major projects in Japan, the US, China and India to accelerate this business growth.



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.

The UN estimates that transforming the global energy system would cost \$1 trillion per year.

(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.



Transportation & Logistics Sectors

Mr. Carsten Hess

Vice-President, Head of Corporate Representation Brussels, Deutsche Post DHL

Deutsche Post DHL has revenues of €46 billion and is a major player in the logistics industry worldwide. The company is committed to sharing its part in a low-carbon economy, for many reasons. Rising energy and emission costs make it cost-effective to cut emissions, while customers are asking for green solutions and as a global business DPDHL has to be organised sustainably. It is the first logistics company with a quantified CO2 efficiency target. Under its GoGreen initiative, the company is committed to improving the CO2 efficiency of DPDHL and its subcontractors by 30% by 2020. In the short term, there is a target to improve its own efficiency (as opposed to overall emissions) by 10% by 2012.

The GoGreen initiative has five pillars: providing transparency regarding emissions; realising quantifiable improvement in CO2 efficiency (as indicated above); mobilising management and employees across the group; creating value for customers; and shaping the political agenda. This latter aspect is very challenging, since the EU has a patchwork of inconsistent transport and environmental legislation and failed to complete the Single Market for all transport modes. For instance, cities just a few kilometres apart may operate to different rules in terms of allowing types of transport vehicles to enter. DPDHL tests various new technologies and solutions at an

early stage, but there is no ‘silver bullet’ for efficiency improvement in logistics. In terms of carbon efficiency, the company is working with three abatement levers: vehicles (e.g. biofuels, hybrid trucks, electric vehicles, more efficient trailer designs); real estate (efficient lighting and heating systems, photovoltaics, etc.); and network (route optimisation, shifting from air to road, new mobile PackStations). In Berlin the company has deployed SmartTruck, an intelligent system for optimising route planning and usage of vehicle capacity (Figure 7). The system receives information in real-time via satellite, enabling it to avoid traffic jams and plan the optimal route for pick-ups and deliveries. So far, the system has cut CO2 emissions by 15% on the routes concerned, and increased payload per vehicle by 20%.

As a final thought, Mr. Hess noted that logistics is a €1 trillion market in the EU (2008/Fraunhofer Institute): even a 10 to 30% efficiency improvement by taking out regulatory complexity would amount to annual savings of between €100 – 300 billion for industry. Over 30% of trucks travel empty but the EU continues to restrict liberalisation of road haulage. Implementation of the Single European Sky Regulation is also proceeding slowly, yet has the potential to reduce CO2 in aviation by 12%. 80% of road congestion is caused by passenger cars but proposed EU road price regulation for congestion will only applies to trucks. Full enforcement of liberalised cross-border rail freight would make this mode more attractive to customers. All of these aspects could be tackled through better regulation.

The EU needs a more integrated policy approach: it must complete the Single Market for transport; tackle congestion at its source; and provide further incentives for research on intelligent transport systems (ITS), for instance through solutions related to the Galileo satellite system. The Alliance for European Logistics (AEL) has recently been formed to promote these ideas, and includes players from outside the logistics industry.



DHL's SmartTruck



Efficient Electricity Distribution

Dr. Eberhard Meller

Senior Counsellor, EWE AG.

As a multi-service company, the EWE Group incorporates three business areas: energy, telecommunications and IT services. This enables it to offer customers an integrated portfolio of innovative products and services. The Board of EWE invited scientists from Germany's Fraunhofer Institutes to work with it to elaborate goals and visions on how to achieve more efficient, economic and environmentally-compatible energy supply solutions. The resulting recommendations, known as the Bullensee Assumptions, point the way for the company in terms of conserving even more energy, significantly boosting energy efficiency, and developing renewable energy sources. They are being put into practice through the E3 programme.

Under E3, the company is piloting a smart metering device called the EWE Box. This provides a data interface in the home, enabling customers to better manage their energy use. It will be rolled out across EWE's customer base by the end of 2010. Another innovation is the use of fuel cell heaters in the home to generate both electricity and heat. EWE has been testing fuel cell devices made by several manufacturers and it is possible these will reach the market within two years. In renewable energies, the company is a partner in Germany's first offshore wind park being built in the North Sea. The park is the first to be built in deep water and the engineering

challenges are considerable. For instance, bringing the power ashore will require 60km of underwater cable at a cost of €500 million – twice the cost of the wind farm itself. It is also investing in electric vehicles (Figure 8).

Finally, as with other utilities, EWE is investigating the implications of widescale take-up of electric vehicles. These have the potential to transform the energy market, participating as producers and sources of power, as well as users. But to achieve this, as Eurelectric has noted, a major shift in the electricity system is needed.

The EWE Box provides a data interface in the home, enabling customers to better manage their energy use.



The E3 Electric Vehicle developed by EWE and Karmann
Source: EWE

Lunch session

Dr. Léopold Demiddeleer, Senior VP Solvay New Business, President of European Industrial Research Management Association, Member of Belgian Royal Academy, Technology and Society Committee



In an informal address during the lunch break, Dr. Demiddeleer offered some personal reflections on the implications of smart energy. We are all individuals, with needs and an energy signature. We should all be asking: "What does the energy challenge mean for me?" Usage-for-all means taking account of the developing world as well. This calls for technology innovation, social innovation and policy innovation, but these should not be in boxes. We are living in a period of convergence.

Population growth had barely been mentioned in the Forum so far. Yet by 2050 the world's population will be an estimated nine billion. Most of this growth will be in Asia, Africa and South America. Europe will be stable by comparison. These emerging market consumers are difficult to reach; education will be key. The implications of this are set out in a book

Sustainable Energy Without the Hot Air, which is available online. Dr. Demiddeleer went on to cite detailed figures from the book on how different areas of our lives equate in terms of energy use.

Climate change involves big numbers. Yet most of the individual choices we make in our daily lives involve consumptions of around 1 kWh – equivalent to around 10 euro-cents in monetary terms. The message was that we have to act as individuals. Either we change our lifestyle or we must reduce the population – we may even need to do both.



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Interactive discussions

Group 1 : Industrial Users Behaviour

Moderator and contribution by: **Bill Duncan**, Managing Partner, Advizors.EU



In the 21st century energy use is growing fast, driven by rapid industrialisation and urbanisation in the world's developing economies. In China alone, total energy use doubled between 1990 and 2006 and is forecast to double again by 2025. In addition, the earth's population is growing faster than ever before, with an extra 1 billion people joining us on the planet between 1987 and 1999 – just 12 years. In parallel we face the challenge of achieving big reductions in CO2 equivalent gases in order to combat the threat of climate change. What can industry contribute to ensure that Smart Energy Usage helps to support a Sustainable Society? The discussion revealed that, while much of industry was working to reduce its carbon footprint to meet legislative targets or to be in line with Emissions Trading Scheme limits, Smart Energy Usage was not yet at the top of its agenda. Very few corporations have an energy “tsar” focused on driving down energy consumption or targeting improvements in energy efficiency (less input per unit of production), or energy intensity (less input per euro of turnover).

Without a highly focused agenda it was felt that Smarter Energy Usage was not yet mainstream and that improvements were more likely to come as a spin-off from other actions, often with economic goals as the principal concern. The group discussion identified several potential drivers which, if present, could strongly influence industry thinking and change standard operating procedures in this area.

These included:

- Investor pressure for companies to become more sustainable
- Board level strategies to enhance brand value and claim first mover advantage
- Competitive responses to initiatives taken by other corporations operating in the same sector in order to maintain a leadership position
- Perceived threats to the security of energy supply
- The need to mitigate the impact of peak energy prices
- Regulation, or the threat of regulation, which could constrain industry's freedom to operate or create a possible competitive disadvantage globally.

One approach considered to have a very strong chance of influencing Smart Energy Usage was the creation of peer pressure by the introduction of a ‘Top Runner’ scheme in

selected sectors, along the lines shown to have been effective already in Japan. The key drivers of change would be the development and publication of sector-specific energy efficiency data with a table ranking competitors from best to poorest, with regular publication and wide communication. Once the momentum for change was created it could be maintained by the use of dynamic targets to keep raising the bar over time.

Industry knows how to innovate, and there are examples of companies or even entire sectors which have risen to the challenge and from whose experiences lessons can be learned.

These include, for example:

- Tesco has used comprehensive planning to reduce in-store energy usage and has lowered emissions from existing stores by 16% since 2006. The company is now designing all new stores to be zero carbon sites.
- Pernod Ricard has cut steam used per litre of alcohol produced in its whisky distilleries by 35% since 2003. This was achieved by upgrading its boilers, evaporators and dryers for energy recapture and higher efficiency.
- The detergent sector's “Wash-right” initiative, encouraged change from the traditional approach to domestic washing habits and focused on more energy-efficient washing cycles, made possible by the development and promotion of new low-temperature washing liquids for laundry. In parallel, the development and introduction of their detergents in single use tablets offered reductions in raw material, packaging and transport use.

Once the momentum for change was created it could be maintained by the use of dynamic targets to keep raising the bar over time.

Large corporations tend to lead the way, often starting the process of change without knowing for certain exactly how this would be achieved. However, over 70% of jobs in Europe are provided by SMEs, who are unlikely to have the resources or knowledge needed to initiate change programmes unless they are part of a broader, dynamic supply chain or are supported by a progressive trade association or chamber of commerce.

Nevertheless, action to reduce energy consumption in offices, rather than in production processes, could more easily be undertaken by companies of all sizes. Around 30% of office



operating expense can be attributed to heating, cooling and lighting, and the installation of smart meters, possibly encouraged by subsidies, would quickly raise awareness of consumption levels and facilitate Smart Energy use with lower costs from lowered energy usage as the motivator for action. Business knows how to balance risk and reward which allows for faster action than is generally possible by governments. However, a clear understanding of policy goals and priorities provides a predictable framework within which commitments to capital expenditures and major investments can more readily be made.

The need for urgency is clear but it may require signs of a return to more stable economic growth for the majority of businesses to put Smart Energy Usage at the heart of their operating philosophy and generate the momentum to trigger change on the scale Europe needs.

Group 2 : Individual Users Behaviour

Moderator and contribution by: **Jenny Dawkins**, Research Director, Reputation Centre, Ipsos MORI



gets to benefit from the public funding available in some markets. Some felt that governments needed to target financial support to the most vulnerable in society, targeting those who also have most need to improve the energy efficiency of their properties.

Consumers tend to be sceptical regarding the financial savings claimed from energy efficiency products. Concrete examples are needed to provide reassurance that new or unfamiliar technologies are already working in other places and demonstrate the savings that can be made.

This session examined the role of individual energy users in smart energy usage for a sustainable society, picking up on some key themes from the morning's presentations. The premise of the discussion was that a sustainable economy needs not just technology but also mass behaviour change – which is perhaps just as challenging to achieve.

Cost is key

Cost was seen as the key barrier, and also potentially the key motivating factor, in encouraging individual behaviour change. Of course, many people are less likely to take action if there is a cost involved, so credible and clear communication on the financial savings that can be made from energy-efficient products and technologies is vital to get over this barrier and engage people in the benefits of more efficient energy use. Financial incentives were seen as an important lever for change, including tax breaks for energy efficient properties, and grants and subsidies towards the cost of installing energy efficiency measures. Concerns were raised that some financial incentives have created disparity; for example, if only the more affluent can afford the up-front cost of photovoltaics (even when subsidised), it is only this section of society which

Technology has a vital role

Technology is expected to make a strong contribution in effecting behaviour change among individuals. Technology is the only way to reduce the cost of energy for consumers given the expected rises in energy prices, and this should provide an increasingly strong motivator for efficient behaviour.

In an area such as this, which is dogged by consumer confusion, the need for technology providers to anticipate consumer demand was emphasised. The concept of 'smart' technology is not yet familiar to many consumers but has the potential to make a major contribution to behaviour change. People must find it easy to adapt their behaviour and 'smart' technology can enable them to be more energy efficient with minimal effort, so widening understanding and availability of this technology was seen as important.

Cost was seen as the key barrier, and also potentially the key motivating factor, in encouraging individual behaviour change.

Real-time information on energy usage – such as smart metering - could really prompt change. Potential ambiguity in the terminology used was highlighted, however. In some cases the energy companies are simply aiming to use the new kinds of metering to provide more accurate billing, not necessarily to provide consumers with more accurate usage information.

Policy or the market?

The question of whether to rely on public policy or the market to drive individual behaviour change was a recurring theme, although no consensus was reached on which would be the fastest and most effective option.

Several examples were given of existing mechanisms and interventions that were not seen to be working well, such as: too many certification and labelling schemes causing confusion; metering that does not provide user-friendly measurements of energy use; and limited progress on the poor state of insulation in housing despite the introduction of energy certificates for house sales in some markets.

Some thought that governments need to play a much more significant role in leading the debate and inspiring change. For example, legislation on the energy efficiency requirements of products, and regulations on the thickness of insulation required in housing were discussed. In any case, it is clear that governments and other parties need to think through and co-ordinate their interventions to ensure they are effective, with sufficient lead time for implementation and avoiding unintended consequences.

Confusion reigns

Widespread consumer confusion was seen to be one of the key barriers in achieving a market-driven solution. There is information overload, with multiple messages and labelling schemes as well as contradictory evidence and advice, so that people do not know what to believe or which products to choose. Therefore, there were calls for more education on the urgency for action, as well as clearer product information. At a more basic level, many consumers still seem to be unaware of the true urgency of climate change and how it is linked to individuals' own energy usage.

In addition to the wider understanding of the issues, there was felt to be a need for practical consumer information on their energy use. As well as a plea for clearer billing, there were also calls for honest and clear information at a product level, including labelling on the energy efficiency of electrical appliances and the benefits of energy-saving products. Consumers need to know 'what's in it for me', with a clear and honest statement of the benefits. Specific suggestions included monetary figures for the cost vs. annual savings and/or payback period of a product (as in the example quoted from Japan). Some suggested that it is the role of government to create a standard formula for the calculation of financial savings, so that this information can be provided on a consistent basis.

Some argued that the full lifecycle effects of products need to be considered, although it is not clear how this information could be conveyed to the consumer.



Changing the debate

Various ways of creating the required education and understanding among individuals were suggested. As well as better communications, the importance of having a targeted approach was emphasised, in terms of distinguishing the 'low-hanging fruit' and 'quick wins'.

The media was highlighted as having a vital role as leaders in the debate on energy use. It is often difficult to present longer-term issues when the natural focus of the media is extremely short-termist. Nevertheless, the media needs to be utilised more effectively in inspiring individual behaviour change.

One participant suggested that there needs to be a more effective consumer lobby on the energy debate. While many NGOs are active in this space, the question was raised as to whether the voices of ordinary people are being heard and their interests championed effectively. Informal and local networks could also be important in raising awareness and sharing best practice.

At a more general level, some found the tone of the debate to be patronising to consumers. It is important not to 'treat people like idiots' but to give everyone the facts and have confidence that they will choose the course of action most beneficial to themselves and to wider society.

Changing norms

Finally, some participants felt it was important to consider other sorts of triggers and barriers in the complex area of behaviour change.

Energy efficiency should be embedded into the accepted social norms of behaviour, making it normal to behave in an energy efficient way, for example by making it 'cool' to aspire to energy efficiency while also bringing peer pressure to bear in the disapproval of inefficient behaviours. A potential disconnect was identified between the two discourses of consumer and citizen, and links need to be made between the consumer mindset (when people are considering the cost and features of products they might buy) and the citizen

mindset (when they might consider environmental issues and their impact on society).

Conclusions

In conclusion, individual behaviour change in the area of energy usage is clearly a very complex area with many barriers and challenges still to overcome. It seems that a combination of public policy and market drivers will probably be needed to effect change on the urgent timescales required. Some of the potential levers in encouraging smart energy usage among individuals are seen as:

- cost benefits and financial incentives
- the role of 'smart' technology and better monitoring of usage
- better consumer product information and wider understanding of the future energy challenge
- ways to potentially shift the public debate and create new social norms.

Group 3 :Addressing the Challenge of Energy Efficiency through ICT

Moderator and contribution by: **Anne Larilhati**, Digital Europe & Head of Global Policy Initiatives, Nokia Siemens Networks



ICT is responsible for about 2% of the global CO2 emissions. Like all industries we are doing our best to minimise our carbon footprint; streamlining our own operations and developing more and more energy-efficient products. Clearly, that is our responsibility. But if we are aiming towards a low carbon, or zero carbon society, an even bigger opportunity lies with the other 98%, the fact that we can help other sectors reduce their CO2 emissions (smart grids, smart cities, dematerialisation etc.). There our absolute impact can be bigger than within our own sector, bringing our net impact on the positive side.

In order to be successful in both approaches we need to link digital technology more closely to EU climate and energy policy and economic development. We need to demonstrate the commitment and leadership of our sector to work in partnership with other sectors and to manage the energy efficiency of our own processes.

Corporations have been long working on their own CO2

footprint, trying to minimise their harmful impact on the environment. Exactly how successful that has been is not completely clear. This is due to difficulties in measurement. Drawing the lines on who measures what is not always easy, and with many companies the use phase is a big contributor to the overall footprint, but not easy to control. For example, even though BMW is putting a lot of emphasis on building fuel efficient cars, at the end the efficiency in the use phase is dependent on the user. Who is responsible for telling the drivers how to drive?

As consumers as well as organisational buyers are facing the problem of difficulties in comparing the energy efficiency of products, several different solutions have been created. For example, labelling is quite popular in the consumer business. However, although useful, it is not a perfect solution, because the fundamental decisions on measurement vary.

And if measuring our own footprint would not be difficult enough, measuring our impact on other industries, and thus coming closer to understanding our net effect is even more so. The ICT sector's own emissions account for about 2% of global emissions and are expected to increase. In 2002, the emissions have been calculated to have been 0.53 billion tons carbon dioxide equivalent (CO2e), and they are expected to rise to 1.43 billion in 2020. But the impact on other industries can have a drastic influence on global emissions, as emissions there can be reduced five times the size of sector's own footprint, i.e. up to 7.8 billion tons CO2e.

It has been calculated that by simply equipping households with smart meters - hence making consumers aware of their energy usage in more or less real time - has resulted in up to 15% reduction in energy use. This is an encouraging showcase of the positive impact of ICT.

This translates to 15% of total emissions by 2020 (in a business as usual scenario).

The improvements for other sectors are expected to come from several different sources. One of the most used examples is virtual meetings replacing travel. The biggest possibilities, and the biggest interest in the ICT industry can be found around smart grids, smart cities and buildings, and smart logistics / transportation.

Smart grids area is creating interest in a myriad of ICT companies. The industry is in the very beginning and the business models are still not clear, but a lot of piloting and trialling is happening already. Opportunities are manifold; ranging from complete redesigns and overhauls of energy grids to simply installing smart meters in homes.

As the value chains and earnings logic is still unclear, this is a perfect time for pre-competitive joint research. Not only companies, but governments and academia should be actively involved as well. Although it might seem self-evident, more cooperation is still needed across sectors, to fully understand what the best solutions are, e.g. logistics, transport, automotive and other related corporations need to be an integral part of the work on smart logistics. Otherwise, we run the risk of not seeing the complete picture, and will end up solving only a small part of the problem and potentially pushing up energy use in other parts of the equation.

It is important to understand that not all industries embrace the ICT sectors' forays into new areas. For example, virtual meetings certainly have a positive impact on the environment, on people's quality of life and the bottom line of the company able to reduce their travel bills. Obviously, although good



news for many, the already struggling aviation sector is less than enthused about the development.

The public sector can play an important role in kick-starting the development of these types of solutions. They have huge assets that can benefit from smart ICT and they should be actively seeking smarter solutions for their building, for their IT, logistics etc. They could also be more active in setting incentives for development on the positive impact arena. This however, brings us back to the importance of measuring. The industry needs to be able to show, in some reasonable accuracy, what the net impact of these solutions is.

To be able to define the impact, we need cooperation with the other sectors. They need to help us measure the difference between the old way of doing things and the "smart" way of doing things. This is not simple, but there are some areas where we are able to measure and the results are very promising. And perhaps the best way to start is from these clear cases. One of them is smart metering. It has been calculated that by simply equipping households with smart meters - hence making consumers aware of their energy usage in more or less real time - has resulted in up to 15% reduction in energy use. This is an encouraging showcase of the positive impact of ICT.

Plenary debate

Responding to the Moderators' presentations, Dr. Meller commented that mention of price as a driving force for citizens and businesses appeared to be missing. As well as regulation, competition is important as a driving force. Big companies are not necessarily best placed to move quickly and are not necessarily in the lead. Small companies can be agile and have the vision to implement new solutions. Mr. Scowcroft agreed that price drives energy efficiency in businesses. The first phase of the European Emission Trading Scheme (ETS) had been considered a failure because the emission reductions were not as large as had been predicted. In fact, the savings were realised not in power companies but in industry through bringing forward small projects with limited payback. Energy costs and carbon price can certainly drive energy efficiency, Mr. Scowcroft concluded.

Mr. Duncan responded that price could be both an incentive and a disincentive. Rewarding good behaviour requires incentives and discouraging bad behaviour requires disincentives and penalties. Europe has a poor track record here, which has left many 'externalities' (to use the economists term) uncoded. While he agreed with Mr. Scowcroft about the importance of price in the past, the question is: "Can we really make the big breakthrough changes in the future without reframing the challenge?". We have to look again at what society needs and how we as businesses seek to meet those needs. We have to be bolder in rethinking the strategic context but at the same time making good business out of it.

From the consumer perspective, Ms. Dawkins agreed that price can be a key driver and also a key barrier. Consumers are sceptical about the costs and benefits of new solutions and need to be shown practical examples of where savings have been achieved. Companies must communicate clearly about the cost of the investment and also the payback period. Incentives and tax breaks can play a role here – but they are not consistent across the EU and there is a tendency for such measures to favour the more affluent and better informed.



Conclusions

Dr. Jean Freymond said the Forum had been most stimulating and had left him wondering where to put his own personal priorities. Speakers and participants had given him new ideas and also confirmed his own thoughts. In wrapping up he wished to emphasise:

Firstly, smart technology is very much available. “Universities and research labs are doing their job”, resulting in a wealth of technological solutions, some already on the market and others in the pipeline. This is good news in terms of our efforts to get to grips with energy efficiency.

Secondly, ensuring large-scale adoption of the technologies remains a major challenge. In these times of shrinking incomes, the price signal is key. This requires a determined marketing push by companies to show that the solutions are affordable and attractive to everyone. We can learn from the developing world here: in Africa companies are thinking about how to appeal to those at the bottom of the pyramid and Europe has to do the same. We need public policies and rules that provide incentives for companies to invest.

Thirdly, it is clear that we cannot rely on governments alone: they are unlikely to be able to implement the necessary frameworks in time. Leadership instead must come from the local level. Cities and local/regional administrations will be key to driving forward policies and as partners for businesses and individual citizens. Fourthly, “we the people” have to regain control and put ethics back at the centre of our thinking. Finally, Dr. Freymond stressed that although an important instrument, “the market should cease to be a jungle ruled by the laws of the jungle” and that education, information and communication are central at European, community and corporate levels. He thanked Hitachi for putting together a unique event at the intersection of science, society, technology and government.

Offering the closing remarks on behalf of Hitachi Europe, Sir Stephen Gomersall recalled that this was not the first time the EU Hitachi Science & Technology Forum had addressed energy and sustainability issues – the most recent being at the Paris meeting in 2007. Much has changed since but also much has stayed the same. Despite the outcome of the Copenhagen Summit, climate change remains a dominant issue for both policy-makers and corporations. As Bill Duncan emphasised in his report back, environmental performance shapes the perception of companies and their performance in the market. Hitachi and other large companies are being called to account through public audits of their emissions.

Practical technologies are now coming closer to the market, and the Forum had heard many examples of this in smart metering, electric vehicles and so on. However, the tools for bringing these solutions together – in areas such as transport, logistics, smart grids, etc – are less obvious. As mentioned by Mr. Sumita, international collaboration will be very important

Collectively, Europe and Japan have a major part of global leadership, both in technology and in visionary thinking, and there are many opportunities for collaboration.

here. This should extend beyond research to areas such as eco-labelling, so as to guarantee fair trade.

It is important to ask “Who is in the lead?”, Sir Stephen explained. As Dr. Freymond had indicated, we cannot wait for government, but industry needs stability and to know the direction of travel. Speakers had suggested a more active and coercive role for the EU. Certainly, the IEA presentation comparing implementation had suggested that the EU needed to do more to get governments to implement even current generation solutions. For large projects (such as nuclear, carbon capture and storage, and renewables), especially, the private sector needs a framework and government should do more to lead the debate and secure public acceptance. Collectively, Europe and Japan have a major part of global leadership, both in technology and in visionary thinking, and there are many opportunities for collaboration.

Sir Stephen thanked Dr. Freymond and all the speakers and participants for their support to the Forum, and Hitachi colleagues for their efforts in organising the event.



Acknowledgments



First of all it gives me great pleasure to extend my thanks to the distinguished speakers and moderators who contributed to this year's Forum. Their professionalism and ability to share their expertise with the audience greatly contributed to the success of this year's event. I would also like to thank all of this year's Forum attendees whose active participation led to extremely vibrant and constructive discussions.

Interaction and lively debate on the given topic area between all participants are two of the main aims of this Forum and my thanks goes to speakers, moderators and participants for helping to achieve this goal.

I would like to express my heartfelt thanks to Dr. Jean Freymond who kindly accepted, this year once again, to be the Forum general moderator and who performed his task with the utmost professionalism throughout the day. As ever, the smooth running of the sessions owes Mr. Freymond a deep debt of gratitude.



My sincere appreciation also goes to the Forum Fellows, whose advice and continuous support for the Forum helped us to identify the most suitable discussion topics, to shape the Forum agenda and to identify high level speakers and moderators. Without this valuable support organizing the Forum would be an altogether different challenge.

Furthermore, we have received great support from several organisations while preparing this Forum: The European Commission (DG Energy and DG Climate Action), The European Environment Agency, Digital Europe and several other Hitachi Group Companies in Europe; all contributed actively. Without this valuable support, organising the Forum would be an altogether different challenge.



As a last word of acknowledgment, allow me to mention the efforts of Mr. Ko Takahashi, the previous General Manager of Hitachi Corporate Office, Europe who has now returned to Japan. For over five years, Mr. Takahashi diligently supervised the organisation of this Forum and much of its success in this period is due to his vision and commitment to contribute to European society through this gathering. We wish him to be as successful in his new assignment as he was while in Europe.

Teruya Suzuki
General Manager
Hitachi Corporate Office, Europe

Speakers & moderators

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|--------------------------|---|
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| Dr. Léopold Demiddeleer | Senior VP Solvay New Business, President of European Industrial Research Management Association, Member of Belgian Royal Academy, |
| Mr. Bill Duncan | Managing Partner, Advizors.EU |
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| Ms. Anne Larilhati | Digital Europe, Head of Global Policy Initiatives, Nokia Siemens Networks |
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| Prof. Jacqueline McGlade | Executive Director, European Environment Agency |
| Dr. Eberhard Meller | Senior Counsellor, EWE AG |
| Mr. John Scowcroft | Head of Unit, Environment & Sustainable Development Policy, Eurelectric |
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12th EU Hitachi Science & Technology Forum 2010

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