Report on the Workshop, Wuppertal

1. Opening

On Monday morning Prof. Akio Morishima (IGES) opened the workshop. In his capacity as president of IGES he welcomed all participants and expressed his pride in promoting the policy dialogue together with the Wuppertal Institute. In his opinion the policy dialogue is a very important effort to learn more about best practices to combat climate change adopted in both countries on a national as well as on a company level. To illustrate the merits of the policy dialogue, Prof. Morishima referred to the Tokyo workshop, which in his view had resulted in detectable shifts in attitude towards ecological tax reform and other macroeconomic policies.

According to Prof. Morishima, the challenge posed by the reduction target fixed in the Kyoto-Protocol is taken very seriously in Japan. To reduce emissions, the government introduced an energy efficiency law in 1998, which, as Prof. Morishima hopes, will help increase significantly the energy efficiency of cars, buildings as well as household appliances. As a second instrument widely used in Japan, Prof. Morishima named voluntary commitments of companies.

Then Prof. Morishima turned his attention towards the Internet Revolution. According to him, the Japanese government led by Prime Minister Mori undertakes a sincere effort to promote the IT-Revolution, with the ultimate objective of keeping pace or, rather, of catching up with the already advanced United States of America. In his view, the Japanese government perceives the Internet as a means to achieving social, technological as well as ecological progress. At the same time, according to Prof. Morishima, the Japanese government is very much aware of the potentially negative ecological impacts of the Internet such as rising energy consumption and the increase in waste. Concluding his elaborations, Prof. Morishima informed workshop participants of a project recently started by IGES. This project, named "Internet and the Environment" led by Kazuo Matsushita (IGES) will hopefully be a contribution to the public debate on the merits and drawbacks of the Internet in Japan and elsewhere. With these remarks on future efforts Prof. Morishima concluded his introductory statement.

2.   *International Climate Policy - The Importance of Domestic Action*

Then Dr. Hermann E. Ott (Wuppertal Institute) addressed the audience. His introductory remarks concentrated on recent evidence of climate change. According to the draft "Third Assessment Report of the Intergovernmental Panel on Climate Change", the rise in global mean temperatures might be as high as 6 ° Celsius in the next 100 years. Thus, the third report will most likely confirm what was already stated in the Second Assessment Report, namely that "there is a discernible human influence on the climate system". From charts that depicted global mean temperatures and the frequency of catastrophes Dr. Ott deduced that action to combat climate change is urgently needed. Humankind cannot wait until the natural sciences will have removed all remaining doubts about climate change. He then shifted the focus of his presentation towards international climate policy. He stressed the importance of the Kyoto Protocol as a legal framework for action on a global level. However, international climate policy at the beginning of COP 6 seems to have lost momentum in the sense that the original goal of the Protocol, which is the reduction of greenhouse gases, seems to have been lost out of sight. Having said that Dr. Ott introduced participants to his European Leadership Initiative, which was the origin of the policy dialogue. This initiative is described in full detail in the report of the first workshop. The main idea, however, shall be sketched briefly: In order to overcome the factual veto power of the United States, the leadership initiative suggests forming an alliance between the EU, Japan and Russia, which quickly ratifies the Kyoto Protocol. The reason for this being that once the Protocol is implemented the evolving legal framework could initiate a dynamic that eventually will force the United States to join.

In order to accelerate the ratification process in the EU and Japan, industry collaboration is essential. Dr. Ott therefore suggested involving industry in a process on best practices. As a start, the Wuppertal Institute and IGES had joined resources in order to initiate the policy dialogue. With reference to the survey that was conducted during the first policy dialogue he concluded that there was wide demand for learning about and co-operation on policies and measures on a governmental as well as on a company level. Exactly this learning as well as the exploration of the scope for policy co-ordination was the purpose of the workshop. Dr. Ott finished his speech by encouraging the workshop participants to actively take part in the discussion: "It is up to you to make this event a success".

GHG Emission Trends of the Internet

1. *Presentation of the Concept*

The art of quantifying the amount of greenhouse gas emissions that can be attributed to Internet use is the art of differentiating between ordinary office use of IT devices and Internet use. Such was the opening remark of Stefan Lechtenböhmer (Wuppertal Institute).

Why worry about GHG emissions? Mr. Lechtenböhmer explained that the starting point of the research conducted by the energy division was a study published by Huber and Mills wherein the authors came up with amazingly high figures for electricity consumption by the Internet. According to this study, 13 percent of today's electricity consumption in the US is used for the Internet, a figure that might, according to Huber and Mills, eventually rise to 60 percent in 2010. Mr. Lechtenböhmer then reported on the scientific debate triggered by this study. Apparently, figures were highly exaggerated, and the actual amount of Internet electricity consumption is in the magnitude of 1 percent.

What is the purpose of such a quantification exercise? Mr. Lechtenböhmer named two: first, this type of study allows interested parties to learn more about the magnitude of electricity consumption due to the Internet today and in the future and, second, it provides an overview of the scope for policy intervention. Mr. Lechtenböhmer cautioned the audience not to draw the wrong conclusions, as the study focused on direct impacts on electricity consumption only. Hence, all indirect impacts as well as the amount of energy consumed by the production of computers etc. were left out of the computation.

After briefly estimating the current electricity consumption of the Internet in Germany, which amounts to 0.8 percent of total electricity consumption, Mr. Lechtenböhmer elaborated on future trends. Determinants of these trends are

- the development of e-commerce, which has triggered the rise in the number of users,

- the amalgamation of Internet and telecommunication services, which may result in entirely new applications like, for example, digital TV boxes and

- the trend towards remotely controlling household appliances via Internet, which will necessitate standby electricity consumption of these household appliances.

For the scenarios Lechtenböhmer´s team had developed two sets of assumptions, one, so called framework assumptions, that served to model Internet usage and, second, so called

specific assumptions that focused on the energy efficiency of employed devices. Thus, framework assumptions dealt with the number of users, the hours of use in different categories of users and the penetration rates of remotely controlled household appliances, whereas specific assumptions focused on electricity consumption per computer, washing machines etc. The scenarios shared the same framework assumptions and differed in the specific assumptions. Mr. Lechtenböhmer then introduced the audience to the findings of the study: Firstly, the Internet could become a major energy consumer. Secondly, there is considerable scope for policy intervention, i.e. if no special action to promote energy efficiency is taken, Germany could be on-line with an annual electricity consumption of around 35 TWh. Were such measures taken, the corresponding figure could be as low as 13 TWh. Thus, if energy efficiency is taken seriously, Germany could avoid 22 TWh of annual electricity consumption, which roughly equals 12 Mio. t of carbon dioxide.

Mr. Lechtenböhmer concluded his presentation with recommendations. According to him, policies should, first, target energy consumption in the off and sleep mode of end user facilities. Certain technologies could already reduce standby consumption to below 1 Watt. These technologies should be promoted. As a second target the on-mode of these facilities should become more energy efficient.

2. Discussion

The discussion started with a fairly technical debate on the assumptions. Various participants questioned the high penetration rate that was assumed in the study. On a more specific level, various participants, among them Dr. Ferdinand Quella (Siemens) and Sylvio Weeren (IBM), criticized that the electricity consumption per PC was assumed to be too high. According to Dr. Quella, more and more PCs will be equipped with LCD monitors resulting in significantly lower energy consumption. Similarly, Mr. Weeren remarked that many PCs used in offices are highly energy efficient laptops. Another remark by Mr. Weeren questioned the very high hours of use assumed for PCs at offices behind firewalls.

Dr. Tae Yong Jung (IGES) pinpointed the suggested conjunction between energy consumption and carbon dioxide emissions. In his view there is no simple one – one relationship as the fuel mix constitutes another major determinant apart from the Internet itself. Thus in a country like Norway where large amounts of electricity are produced by hydro

power stations, energy consumption of the Internet may not be a problem relevant to climate policy.

In his comments Val Herman (ICL) emphasised the importance of a differentiated look at the hidden driving forces that affect the psychology of users and hence their Internet use. According to him, it is necessary to distinguish between Business-to-Business (B2B), Business-to-Consumers (B2C) and Mobile-Commerce (M-commerce). At the moment the largest fraction (about 85 percent) of e-commerce activities in western countries is B2B, followed by B2C (14 percent) and M-commerce (rest). The question arises which sector is going to grow the most. Looking at the marketing and advertising Mr. Herman expected a tripling of household spending in B2C. With all these figures in mind, the methodology chosen and assumptions made in the presentation appeared rather static.

To Dr. Quella the assumptions concerning household appliances pointed in the wrong direction. His company recently installed installation buses at a commercial bank in Frankfurt that served to remotely control the facilities of this office building. After the project had been implemented electricity use in this building declined by 20 percent. In his response Stefan Thomas (Wuppertal Institute) stressed once again that this type of energy saving was not to be looked at as it is defined an indirect impact.

After this intense discussion on a technical level, Shuzo Katsumoto (IGES), author of the paper "GHG Emission Trends of the Internet: Indications to Facilitate Research" briefly sketched his findings on a methodology appropriate to quantify electricity consumption that can be attributed to the Internet. According to him, the two approaches differ significantly in scope. Whereas the Wuppertal Institute had produced scenarios on the direct impact, he had endeavoured to set up a methodology suitable to grasp the entire set of impacts of the Internet. However, due to the more holistic nature of his research he could, given the available amount of time, only deduce formulae that would ultimately lead to a comprehensive picture of the impacts of the Internet. As a preliminary result Mr. Katsumoto emphasised that the Internet should not exclusively be viewed as an energy consumer but as an infrastructure that, despite causing expenses in terms of electricity consumption, has the potential to help save huge amounts of energy elsewhere.

To stimulate discussion on the connection between international climate policy and the Internet two participants had been invited to comment on the presentations. First Kazuo Matsushita (IGES) expressed his gratitude to all staff involved in the preparation of the

workshop as well as to the participants from industry. In his view the IT-revolution cannot be underestimated in its impacts. Therefore IGES will make "IT and the environment" one of the topics of the strategic research plan that will be implemented beginning April 2001. Within the framework of this project, the team at IGES will systematically explore the positive as well as the negative potential impacts of the Internet Revolution.

Mr. Matsushita further highlighted the strengths as well as the weaknesses of the German and the Japanese paper on GHG emission trends. In his view, the German figures encourage the Japanese experts within IGES to carry out the same exercise in order to gain a first order estimate. The German counterparts, however, should feel encouraged to broaden the scope of their study. He recommended exploring systematically the energy consumption of PCs in on-mode as was done by the Jyukankyo Research Institute[1].

A general remark that in the opinion of Mr. Matsushita applied to both, the Japanese and the German paper, referred to the underlying presupposition of both papers, which is to view the Internet as an energy consumer. Although this was certainly true, this presupposition puts aside the fact that the Internet may help save energy. Moreover, the Internet may be a means to achieving the dematerialization of the economy as well as a change in its industrial structure, which could result in lower resource and energy intensities per unit of value added. Even more importantly, the Internet may change people's lifestyles and behaviour completely. Mr. Matsushita urged the audience to acknowledge that as of today, nobody knows in which direction these changes will lead.

Then Siro Nishi (Nippon Telegraph and Telephone Corporation) introduced several initiatives to cut electricity consumption that had been taken by NTT, the largest telecommunication company in Japan. Electricity consumption by NTT was 5.2 trillion kWh in 1998, and is expected to rise to 6.4 trillion kWh in 2005, and to 10 trillion kWh in 2010. To reduce electricity consumption to its 1990 level, NTT has conducted R&D on LSI, power source devices, fuel batteries, and solar batteries.

While estimating that increased numbers of PCs and servers will certainly increase society's total electricity consumption, Mr. Nishi addressed the potential of IT to lower energy use in several areas. He first exemplified a result of the research that had been done by Prof. Yasui of Tokyo University. The research attempted to calculate CO_2 emissions caused by different means of conveying a 1000-character-letter to a 100 km distant destination. The

result showed that 5.3g of CO_2 is emitted from a postal letter, less than half of it from an e-mail, and an even smaller amount of CO_2 from a PDA or mobile phone. Mr. Nishi also presented another example of comparative research on CO_2 emissions from video-conferencing and conventional business trips. The research took samples of 1650 practical business trips and revealed that CO_2 consumption by video-conferencing is only 15 percent of that consumed by conventional business trips. In his concluding remarks, Mr. Nishi expressed his expectation for research institutions to conduct further quantitative research on IT that contributes to the reduction of CO_2 emissions.

To speak of the Internet Revolution means to speak of complex social and economic interactions that will eventually affect the greenhouse gas emission profile of countries. Dr. Jung therefore felt the need to broaden the horizon of the debate and to shortly reflect on the nature of the Internet Revolution. The very essence of this revolution is the dramatic increase in the amount of available information, at very low or zero transaction costs. As of yet, nobody can predict the changes in social and industrial structure that will result from this revolution. However, in comparison to the direct impacts that were being discussed in this workshop, the implications on the GHG profile from the shift in social and industrial structure will by far excel those direct impacts. To Dr. Jung the current way of production is still heavily influenced by the industrial revolution that started two centuries ago. With the Internet, however, completely new types of businesses, which are mostly human resource intensive, will emerge. Further he emphasised that with the Internet economic action could in some fields attain the ideal concept of perfect competition – a notion that has theoretically existed in economics for many decades. Taking online shopping as an example he explained that online transactions might indeed replace the effort of maintaining the infrastructure required to carry out shopping in real shops, which in turn might result in actual GHG emission savings. At the same time the number of transactions overall might increase significantly. Thus individual GHG savings per transaction may be offset by an increase in the number of transactions. From this example Dr. Jung deduced that as of yet, no predictions on the implications of the Internet could be made.

After these three comments the floor was opened for discussion. Mr. Herman took the opportunity to state his views on the basic problem with all attempts to increase energy efficiency in households: the monthly electricity bill per household is too low in order to

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[1] The Paper "Towards Higher Energy efficiency of IT-Products: The Japanese Approach" covers some of this work.

provide incentives for individual households to attempt reducing it. Therefore, individual households are not really prepared to tap their energy saving potential. However, the collective energy saving potential of all households together is fairly significant. Thus it is worth the effort to encourage energy saving behaviour in individual households. The debate on saving energy cannot focus on producers or governments in their roles as signatories of the Kyoto-Protocol alone, but has to include the responsibility of governments towards civil society to encourage citizens to use proper energy management systems. The message "turn it off" has to come down from governments to individual consumers. If governments succeeded in this action, it might have a greater effect than all eco-labelling or regulation put together.

Roundtable Discussion: Return, Reuse and Recycling of IT-Products

1. A Comparative Analysis of the Japanese and the German / European Approach

In his presentation Thomas Dworak (Wuppertal Institute) acquainted workshop participants with both discussion papers on "Reuse, Recycling and Return of IT-Products", which both are presented in full length in this report.

Mr. Dworak led off his presentation by introducing the participants to three drafted EU directives that are currently being prepared by the European Commission. These three draft directives are

- the Waste Electrical and Electronic Equipment Directive (WEEE directive), which, if enacted, will trigger the establishment of collection facilities for electrical and electronic waste in the member states of the EU;

- the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Directive (ROS directive), which, if enacted, will require the substitution of lead, mercury, cadmium, hexavalent chromium and certain flame retardants in electrical and electronic equipment after 2008; and

- the Directive on the Design and Manufacture of Electrical and Electronic Equipment (EEE directive), which, if enacted, will intervene in the design of such equipment such that its overall negative impact on the environment during the entire life cycle is minimised.

According to Mr. Dworak, all these directives are expected to have a major impact on the policy mix in the individual member states of the EU. However, due to the inevitable uncertainty of forecasts it is virtually impossible to estimate the ecological impacts of these directives. Mr. Dworak then focussed on the Japanese policy mix. Referring to the Japanese discussion paper he claimed that essentially two laws form the framework that regulates the issue under consideration. These are

- the law for establishing the recycling-based society; and

- the basic environmental law, which establishes principles concerning environmental protection and the duties of all actors concerned.

Various acts and specific laws accompany these two framework laws, as reported by Mr. Dworak. Comparing the two policy mixes Mr. Dworak concluded that there were two main differences. Firstly, the WEEE Directive follows the producer pays principle whereas in Japan the consumer pays principle is applied. Secondly, there are no bans of hazardous substances in Japan, whereas the ROS directive explicitly bans certain substances from almost all types of electrical and electronic equipment.

2. Discussion

Mr. Herman's comment related to the timing of all mentioned EU directives. Most likely it will take until the end of the decade until the WEEE and ROS directives will have passed the EU level and will be implemented in the member states. Thus first impacts can only be expected from 2010 onwards. They therefore do not offer a short-term solution to the environmental problems of the IT-industry. Further, the second, unofficial draft of the EEE directive is currently plagued by a controversy about different labels that could be introduced as a consequence of this directive.

On the differences between the EU and Japan Mr. Herman commented that the scope of the EU directives is much wider than that of the Japanese laws. Whereas Japanese regulations target only four product categories, the EU directives in principle cover all electrical and electronic equipment on the market, even silly things like electric noses that light up for Christmas.

Another remark concerned the impact the WEEE directive could have on the prices of electrical and electronic equipment. According to Mr. Herman the potential price increase of three percent stated in the discussion paper "Return, Reuse, Recycling of IT products: The German / European Approach") is an estimate of the European Commission. Industry, however, reckons that prices of certain products might go up between five and ten percent. Such an increase could in turn lead to shifts away from production within the EU to production in East and Central Europe. This is due to the fact that some companies operate on such small profit margins that an additional cost burden such as the return of products after use, as foreseen in the WEEE directive, might render them non-profitable.

Returning to the differences between Japan and Europe, Mr. Herman referred to the lobbying around the ban of hazardous substances in Europe. In his view Japanese companies do not view lead phase-out as a major challenge. Therefore the Japanese approach, which relies on voluntary phase-out, works well in Japan. On the other hand, American companies strongly advocate that such a phase-out cannot be achieved by 2008 and even then only at great costs. In between these two poles is where Mr. Herman situates many European companies.

Even though the WEEE is an EU directive it does not attempt the harmonisation of laws, hence Mr. Herman did not perceive an emerging market for the end of life management of electrical and electronic equipment. The already existing legal frameworks in some member states seem to diverge and he did not expect that the WEEE directive would bring about significant convergence.

After these comments by Mr. Herman that were mainly concerned with the European approach, Takeshi Koga (Fujitsu Limited) laid out several views from the Japanese perspective. He first expressed his concern about the recent substantial increase of disposed PCs in Japan. According to Mr. Koga, Japan has a recycling scheme for PCs disposed by private companies, but not for ones disposed by households. How to collect and deal with used PCs released from households? This is an urgent task to be tackled in Japan, emphasised Mr. Koga. PCs disposed by households are currently collected and dealt with by municipal governments in Japan, but a new law to be enacted in April 2001 requires private entities to take the responsibility for their disposal.

Mr. Koga then turned to some technical issues related to Recycling, Reduce, and Reuse (3Rs). He stressed the importance of technologies to replace lead in PCs, and maintained the need to lower costs for substituting plastic with magnesium, excluding cables made of chlorine, etc.

With regard to the Japanese approach, Koga added several points to the discussion paper. First, he reported that 45,000 tons of PCs were disposed off in Japan in 1998, of which 600 tons--not yet a substantial amount--were disposed by households. Approximately 95 percent of disposed PCs are manually broken down and sorted, and the remaining 5 percent are dealt with by using a shredder. Mr. Koga drew special attention to the fact that manual sorting is working pretty effectively in Japan.

Further Mr. Koga mentioned the so-called Voluntary Approaches led by "Keidanren", the Japan Federation of Economic Organisations, as a successful policy. In his view, Japanese IT-related companies are actively promoting recycling through Keidanren's Voluntary Action Plan.

In addition to recycling, reuse is another powerful measure to reduce waste of IT-products. Mr. Koga therefore showed his strong expectation to form a market for reuse. Despite the fact that PCs are subject to frequent model changes that render them obsolete so soon, Mr. Koga thinks that if the IT-related industry offers a new service that renews or upgrades PCs, reuse can be fostered further.

To conclude his comment Mr. Koga returned to the issue of lead that is used in manufacturing PCs. In his view, Japanese IT industries have been actively promoting technology development to remove lead from PCs. However, they are encountering difficulties in their price management since the substitution of lead usually leads to a higher production cost. In the case of Fujitsu, it costs one additional yen per PC board to substitute lead with another lead-free alloy, stated Mr. Koga.

Concerning the German policy mix Dr. Quella added that the German DIN together with major companies prepared a draft standard that is expected to help overcome the legal problems related to using re-used components instead of newly produced ones. Apparently this draft is on the way to becoming an ISO standard. Then Dr. Quella turned to the question of international standards. From his point of view lead-free soldering provides a good example for the necessity of such standards. Currently, global players use the same solder systems and the same printed circuit boards. This might change with the gradual introduction of phase out regulation in individual countries with significant implications for trade as well as quality assurance. Thus, according to him, the phasing out of lead threatens the unity of the market.

In response to that, Mr. Herman clarified the character of the WTO challenge by the American Electrical Industry Association and the US trade department. The US claims that the WEEE directive in its current form violates WTO principles as it constitutes a trade obstacle that is not justified by the scope of the problem. Therefore the best way to deal with the phase out would be an ISO standard along the lines of ISO 14092. However, it would be a long process to implement such an ISO standard - about 10 years. Hence, quick action is needed in addition to a medium to long-term fix.

The issue of lead phase out is solvable, according to Mr. Koga. In his view quick action is urgently needed and possible. His suggestion would be to set up a label "lead-free" or incorporate this notion into an eco-label. If such a label were to be introduced in Japan and Germany it would contribute towards phasing out lead quickly. Green purchasers could then redirect the demand towards lead-free products.

Takaharu Gamo (Matsushita Electric Industrial Co., Ltd) expressed his support to the necessity of international standards and his willingness to pursue such international co-ordination processes. At the same time, Mr. Gamo indicated that the E-E mark described in the EEE directive is a Europe-oriented process that is not coherent with the ongoing globalisation of standards.

A different light on the policy making process was shed by Dr. Quella. From his experience he stated that both, German and European research policy, was well-funded and supported while preparing directives. However, once such a directive had been published the follow up was missing. To illustrate his claim he referred to the debate on lead-free soldering and halogen free plastics. After the publication of the corresponding directive on halogen free plastics hundreds of patents were developed in Japan, between thirty and forty in the US and one in Germany. So evidently, policy makers in Germany and the EU fail to set policies after the publication of directives. Furthermore there exists confusion on the distribution of responsibilities between the German government and the EU. In comparison, Dr. Quella had the feeling that in Japan the MITI and other authorities were much better at managing the technological development after a policy target was set.

Roundtable Discussion: Towards Higher Energy Efficiency of IT-Products

1. A Comparative Analysis of the Japanese and the German / European Approach

Increasing the energy efficiency of Internet equipment is a matter of tackling a variety of different products at very different modes of operations (on-mode, standby, etc.). Such was the introduction to the subject by Mr. Thomas. At the moment the various elements of the policy mix in Japan as well as in Germany only deal with either specific modes or specific product categories, mostly PCs. However, what causes GHG emissions is the totality of all modes of one product over a range of time, so there is evidently a gap to be bridged in order to reach effective regulation. But there also is, according to Mr. Thomas, a wealth of different policy instruments such as voluntary commitments, negotiated agreements and obligatory minimum efficiency standards that target manufacturers as well as energy labels, eco-labels, endorsement and qualification labels, procurement schemes and a number of information policies that target consumers.

As in other fields of policy action the German approach to energy efficiency is determined by EU legislation. In other words, member states cannot set up mandatory minimum energy standards or labels that compete with EU regulations. However, Mr. Thomas emphasised that, on a voluntary basis, member states may go ahead in pushing certain standards further and, of course, member states may establish policies in fields where there is no common EU policy. Mr. Thomas listed two major characteristics of the EU approach. Firstly, standby electricity consumption is the main focus of EU / German policy makers. Secondly, there is a clear tendency in the EU towards voluntary and negotiated policy instruments.

Among the set of instruments on the EU level the energy star label and the negotiated agreement on external power supplies are the most important ones. Whereas the negotiated agreement on external power supplies sets a new standard for these facilities, the energy star label merely consists of taking over the existing US label that some manufacturers have already applied. On one hand this label can be characterised as ecologically effective as it establishes the power save mode and can almost be characterised as a global energy efficiency

standard for this mode. However, in Mr. Thomas' opinion it is questionable in how far the energy star label really sets new incentives for European manufacturers. In addition, the energy standard has been criticised for its eligibility criteria that are met by many of the products already on the market.

In addition to EU policies, there are also policies peculiar to Germany to which Mr. Thomas devoted some time in his presentation. He personally liked the "off equals off" campaign of the German Umweltbundesamt (Federal Environment Agency), which is an attempt to increase the amount of products with a real off switch, i.e. a switch that disconnects the facility from the electric circuit. The second instrument, accentuated by Mr. Thomas, is the Handbook for Green Procurement published by the Umweltbundesamt. This handbook has proven to be fairly influential in shaping the procurement of public as well as private entities.

Shifting the focus of his presentation towards the Japanese strategy to increase energy efficiency, Mr. Thomas declared that this strategy appeared to be more comprehensive than the EU strategy.

Among the instruments that are being used in Japan the minimum energy efficiency standard for PCs deserved special attention. This law was introduced in 1994 and tightened in 1999. The minimum energy efficiency standard is hereby linked to the electricity consumption of the best appliances available on the market. The law has also been extended to further product categories. However, even this law does not target all modes of operation. Also the link between computing capacity and energy consumption foreseen in the law proved ineffective. As computing capacity improves faster than electricity consumption it becomes progressively easier to fulfil the requirements of the law. In that regard, Mr. Thomas mentioned that already one year after tightening most products on the market met the standards.

The second policy that has had a major impact on the energy efficiency standard is the energy star label for office equipment that Japan took over from USEPA. As Japan took over the same eligibility criteria as the EU the energy star label is confronted with the same criticism as in the EU. Despite this shortcoming, the energy star label has been introduced successfully in Japan and is accompanied by information campaigns and procurement schemes.

From Mr. Thomas' point of view more co-ordination and harmonisation of international labels is desirable. He suggested that eco-labels should simply refer to pure energy labels like

the energy star, rather than defining their own energy criteria. Thirdly, the energy star label as a successful global instrument should be extended to other modes, particularly the on-mode. And lastly, Mr. Thomas suggested that given the European experience with the GED label, countries should not hesitate to set up labels that partially compete with international labels and that are more ambitious than international labels.

2. Discussion

International co-ordination of harmonisation is a worthwhile goal, however, Mr. Herman could not see how it could be operationalised. According to him, at the moment there are international, national, regional and sometimes even local labels: "The situation is a mess". There is too much competition between labelling authorities trying to get their own labels and standards in place. This abundance of labels has two implications. First, manufacturers do not know which way to go. And, second, consumer's choice is complicated unnecessarily. Consumers cannot be expected to know whether a blue angel is better than a white swan or an energy star.

In response, Mr. Thomas sketched his vision of two parallel labels - one that could be developed by international authorities such as the EU and more ambitious labels developed on a national or regional basis. Inevitably, the international label would represent the minimum consensus of participating countries. It would guarantee purchasers a certain minimum environmental standard. The national label, however, would then appeal to more quality oriented and environmentally concerned buyers.

From an energy saving point of view the enabling of the power saving mode is crucial. Dr. Tiny Huijben (Oce Technologies) enquired why the power saving mode was often disabled in PCs. The answer is a very technical one, according to Mr. Thomas. Computers have been sold with the power saving mode disabled in the past, due to problems with Intranet PCs operating in power save mode. As many consumers do not realise this opportunity to save energy, this mode is often never switched on. Mr. Thomas quoted a study from the United States which claims that currently only half of the PCs with the technical features necessary to save energy are actually run in power save mode.

To Dr. Jung the energy star label represents more the command and control type of measure. It effectively is a minimum energy efficiency standard and only to a minor extent an instrument to redirect consumer demand towards energy star labelled products. From his

experience, extra features like the energy star label are not recognised by Japanese consumers. They merely compare the performance per price. Further Dr. Jung clarified that energy labels or standards do not cause changes in the behaviour of consumers. Therefore he strongly recommended developing policies that directly target consumer behaviour.

Mr. Gamo took the chance to introduce the participants to the Matsushita energy conservation project. As a manufacturer, Matsushita assumes responsibility for both the products it produces and for the production process itself. Consequently, the energy conservation project targets the electricity consumption of the entire range of products, i.e. refrigerators, microwaves, IT products and many more. This effort is also to be viewed in the light of the law concerning rational use of energy amended in 1999. Eight product categories, all of which are produced by Matsushita, are subject to regulation - among them photocopiers and computers. This law is particularly dynamic as it introduces the "top runner" approach, which means that minimum efficiency standards are tied to the best available technology on the market in autumn 1998. These minimum standards must be met in target years that range, depending on the product category, from 2003 to 2007. The penalties for violation of the law include the termination of production. Already Matsushita is on its way to significantly improving the energy efficiency of its products. The second component of Matsushita's energy conservation project targets the production side. Again Mr. Gamo contrasted attempts by his company with the requirements of the law concerning rational use of energy. This law establishes two categories of factories and operating units according to their annual energy demand. Depending on the class in which an individual factory is located, the company must carry out certain measures that help reduce energy consumption. Of course Matsushita is prepared to take the challenge seriously. However, Matsushita needs to take more action as currently there is still a gap between the forecasted GHG emissions of Matsushita and its own voluntary commitment.

In his comment Hidemi Tomita (Sony Corporation) explained Sony's strategy of moving towards higher energy efficiency. Like Matsushita, Sony produces a variety of products that differ greatly in their GHG emission profiles. This fact was confirmed by life cycle analysis carried out by Sony a few years ago. Mr. Tomita deduced from this study that attempts to increase energy efficiency should target large products with long use phases, such as TV sets or video tape recorders. Further Mr. Tomita explained how - over the course of several years - Sony observed a correlation between the weight of certain products such as camcorders and walkmans and their energy consumption. According to Mr. Tomita, Sony is very much aware

of the challenge posed by the transition to a sustainable society. It has already developed a vision to make Sony more sustainable. As a means to operationalising this notion Sony has developed an eco efficiency index, which includes carbon dioxide emissions. As Mr. Tomita stressed, Sony takes responsibility for its products by incorporating the carbon dioxide emissions caused by the production as well as by the use of its products in the calculation of this eco-efficiency index.

Roundtable Discussion: "Eco-labelling and Green Procurement Schemes for IT-Products"

1. A Comparative Analysis of the Japanese and the German / European Approach

The presentation by Tsuneo Takeuchi (IGES) aimed to provide the participants with an overview of eco-labelling and green procurement schemes for IT products in Japan and Europe. He first introduced the Japanese eco-label called the Eco Mark, which is similar to the German Blue Angel. According to Mr. Takeuchi, the Eco Mark certification criteria for PCs were established in September 2000 and include categories such as: design for recycling, design for long-life use, collection and recycling system, chemical substances, noise, and energy efficiency. The criteria for energy efficiency utilise the efficiency standards set under the International Energy Star Program and the Japanese law called the Law Concerning the Rational Use of Energy (the so-called Energy Conservation Law).

Along with the Eco Mark, which is very popular in Japan, there are many other eco-labels, stated Mr. Takeuchi. The Japan Electronic Industry Development Association (JEIDA) is preparing to create its own environmental labelling system for computers. The JEIDA labelling system includes ten categories for its certification criteria and is to be launched in the spring of 2001. Also, there are some individual manufacturing firms that have initiated their own environmental labelling systems to date.

Some statistical data led Mr Takeuchi to put forth a suggestion on eco-labelling. The Environmental Data Book published by a Japanese organisation called the Green Purchasing Network (GPN) shows that 92 percent of desktop computers and 100 percent of notebook models met the criteria of the International Energy Star Program as of August 2000. To Mr. Takeuchi, this fact means that the widely prevailing International Energy Star Program is not practically effective to judge which computers are really excellent in energy efficiency, but that it just serves as a criterion to represent a minimum-level standard. Mr. Takeuchi therefore deduced his suggestion that, besides eco-labels like the International Energy Star Program that sets a minimum standard, other eco-labels that have more rigorous criteria are necessary.

Then Mr. Takeuchi turned his focus to the German/European approaches. In reporting on the German initiatives, he first mentioned a comprehensive handbook published by the

German Federal Environmental Agency. The handbook called "Environment-friendly procurement—a guide to take into account environmental aspects in public administration and in purchasing" currently serves as a criterion for green purchasing procurement in Germany, and is being used mainly by government organisations. Mr. Takeuchi, on the other hand, critically pointed out that the Blue Angel does not cover many of IT-related products at present, and hence the German green procurement has not achieved much in the IT area. As one of the European initiatives, Mr. Takeuchi addressed the European Green Purchasing Network (EGPN) that was founded in 1997 by the partnership between the European Partners for the Environment (EPE) and the International Council for Local Environmental Initiatives (ICLEI). EGPN places its central objective on information exchange among its member organisations, but is planning to extend its task by publishing a workbook on green purchasing in Europe. EGPN also aims to further green purchasing initiatives with about 1,000,000 corporations--mainly small- and medium-sized enterprises and public authorities, in co-operation with the WBCSD and the European Eco-efficiency Initiative.

Returning to the Japanese approaches, Mr. Takeuchi again referred to the Green Purchasing Network (GPN), a Japanese not-for-profit organisation established in 1996, that plays a central role in Japan. GPN currently counts more than 2,200 organisations such as corporations, local governments, and environmental NGOs among its members, including the five Japanese companies participating in the workshop, and issues the Green Purchasing Guidelines that cover IT products such as PCs, printers, and copying machines. Along with the Eco Mark and the Environmental Data Book previously introduced, the purchasing guidelines are being utilised by Japanese consumers as a major measure when buying green products, stated Mr. Takeuchi. He then turned his attention to a legal aspect by introducing the so-called Green Purchasing Law. The law was enacted in May 2000 and requires national and local government agencies to implement green procurement. Mr. Takeuchi expected it will have a great impact on the green purchasing market in Japan.

In concluding his presentation, Mr. Takeuchi claimed that if consumers of PC products could change their behaviours from "purchasing" to "borrowing", and from "possessing" to "using", then waste problems might be solved to a large extent.

2. *Discussion*

It did not surprise Mr. Herman that EU eco-labels have not been successful in terms of the number of products that have been awarded the labels. The reason is very obvious, according to Mr. Herman: individual consumers, and he stressed individual consumers not corporate consumers, buy along the lines of four criteria only: price, performance, appearance, functionality, of which the first two are the most important. Concerns about the environment do not enter the decision-making process of consumers at all. Therefore he wondered whether eco-labels were more successful in Japan and if so, why?

There are basically two kinds of eco-labels that are implemented in Japan, explained Mr. Takeuchi, responding to Mr. Herman's question. The Eco Mark, which he introduced in his presentation, is one of the two, but there is only one in the PC-related products that has received a certification by this mark; hence Mr. Takeuchi thinks it is too early to judge whether the mark is successful. The other one, the Energy Star label, however, has been successful, believes Mr. Takeuchi. He claimed that the Energy Star label has been widely prevalent in Japan and most PCs have already met its criteria. Mr. Matsushita clarified that the energy star label standardised only the low power mode. This might mislead consumers who might falsely assume when buying a computer with the energy star label that they were buying the most energy efficient product. Mr. Matsushita quoted the paper "Towards Higher Energy Efficiency of IT-Products: The Japanese Approach" that given these shortcomings it might be necessary to completely reconsider the approach chosen with the energy star label as a means to raising consumer awareness towards energy efficiency. Secondly, Mr. Matsushita referred to Nakagami's claim that the energy star label might actually pose a barrier to further reducing the energy consumption of products in modes other than the low power modes.

Mr. Takeuchi agreed with Mr. Matsushita on these points and stressed the limitation of the Energy Star Program that does not target the on-mode of PCs.

In response to Mr. Herman's question, Dr. Jung commented on the Japanese side. Similar to Europe, Japanese consumers do not respond to the energy star label as the total electricity bill in relation to the utility provided by computers etc. is negligible. To illustrate his comment Dr. Jung referred to the protests against the increase of the oil price in autumn 2000 in France. Apparently, the oil price increase was perceived as significantly affecting the monthly energy bill, whereas the electricity bill in relation to household income is too small to make consumers aware of the energy saving potential they have. Interestingly, this holds true

despite the fact that electricity prices in Japan and Germany are already fairly high. The second issue that significantly shapes consumer preferences is the relation between fixed costs and operating costs. Currently, when consumers buy computers, the price of the computer, which is a fixed cost, outweighs all considerations to operating costs, namely costs of electricity. Referring to Mr. Takeuchi, Dr. Jung underlined the importance of leasing or renting schemes that could help place operating costs in the centre of consumers' considerations. Therewith electricity costs could enter the consumers' rationale.

This direction of thinking was absolutely right, reinforced Mr. Herman. He provided the example of how consumers chose Internet providers. Their competition is based on the price per minute of Internet access and therefore purely on operating costs. And although the total bill for Internet access is relatively low compared to the entire household expenditure, consumers carefully watch prices and respond even to marginal price differentials.

Adding the industry perspective Mr. Weeren argued that eco-labels played a decisive role in the discourse of product development. Eco-labels helped structure the debate in the direction of more environmentally friendly products. However, the current variety of eco-labels misleads at least private consumers and, on the side of the manufacturers, this variety causes high efforts in terms of human resources. In particular, these transaction costs disadvantage companies that care about such labels relative to companies that do not care at all. The situation is worsened by the fact that manufacturers like IBM compete with such non-caring companies in markets where profit margins are already very low. He therefore welcomed that the Japanese Eco-Mark adopted the criteria of the German Blue Angel.

A second explanation for the relative failure of eco-labelling might be that current requirements of eco-label authorities necessitate a lot of paperwork on the part of manufacturers. These efforts in turn extend the time between the application for awarding a label to a product and the actual award to several months. In a market where product cycles are very short a delay of several months between product introduction and the eco-label award may result in a situation where a product is taken from the market before the eco-label is recognised by consumers. Evidently, such a situation is completely counterproductive.

Regarding transaction costs Mr. Weeren further explained that in some cases, he particularly mentioned the Euroflower, the ratio of costs for the label to total revenue on the labelled product was very bad.

Eco-labels will also have to take on the challenge posed by the Internet age. According to Mr. Weeren, eco-labelling must be extended to new product categories, such as servers. Particularly, the number of mid range servers will increase dramatically, however, none of the eco-labels covers this product category as of yet.

On a methodological level, eco-labels suffer from their digital character, meaning that either a product is awarded a label or it is not, so said Weeren. As an example he presented his IBM laptop, which according to him would never be awarded the German Blue Angel label - simply because it violates one minor criterion. So he would like to see a more analogous way of incorporating eco-criteria into labelling schemes, like a credit point system or other options for ranking.

As a means to facilitating the process of information provision on eco-features of products Mr. Weeren proposed to focus on industry self declarations. According to him, the EGMA Technical Report 70 could provide a good basis for such information gathering, as it includes many of the aspects also discussed during the workshop, namely electricity consumption, inclusion of hazardous materials, recycability and many more.

In Mr. Weeren's view the environmental data books used in Japan mentioned in the discussion paper "Eco-Labelling and Green Procurement Schemes for IT-Products: The Japanese Approach", could also provide a good basis for supplying information to environmentally-concerned consumers. However, to turn them into an international instrument, the Japanese environmental data books should be available in English and be put on the Internet.

Mr. Koji Yamaguchi (NEC Corporation) began his comment by referring to Mr. Takeuchi's claim about leasing schemes of IT products. He maintained that the leasing scheme needs to be seriously discussed to find a way that is most environmentally friendly and best satisfies consumers' demands.

Through the series of sessions at the workshop, it seemed that the participants had merely regarded PCs as hardware when discussing their energy efficiency; on which Mr. Yamaguchi shed new light. In order to examine or calculate environmental impacts of a PC, energy efficiency of the software used needs to be taken into consideration as well. Mr. Yamaguchi explained the reason by introducing the fact that depending on what software is used the amount of energy consumed by a PC varies widely. An eye-opening insight drawn by Mr.

Yamaguchi was that PCs should be seen as a mixture of hardware and software in considering their environmental implications.

Turning to the issue of eco-labelling, Mr. Yamaguchi alerted participants to the fact that electricity consumption or green house gas emission is, among others, just one factor that should be addressed by eco-labels. He exemplified that, in the case of paper, consumers would be concerned about factors such as what percent of recycled paper is used and whether or not bleach is included. He then underlined the significance of taking into account necessary factors for eco-labels for PCs, not to focus on electricity consumption alone.

There are two kinds of expected effects in establishing eco-labels, said Mr. Yamaguchi. One is to provide environmental information of products to the public, and the other is to advance the development of environmentally sound products by manufacturing companies. He reported that NEC as a manufacturing company had set its own eco-label requiring fairly rigorous standards, and that it had helped to enhance the environmental excellence of NEC products.

With regard to certification criteria of eco-labels, Mr. Yamaguchi first stated that there are also two major approaches. One, the so-called "top-runner" approach represented by the Blue Angel, with its demanding standards, aims to help advance technology development at a high level. The other, with its relatively easy-to-meet standards, aims to help advance technology development for products with poor environmental performance. Then Mr. Yamaguchi expressed his opinion that certification criteria of eco-labels for PCs should, if possible, be determined through international co-ordination because PCs are a global product. He also presented his idea that both medium term and long term criteria are desirable. In his view, medium term criteria would be standards to be achieved in about 1 year, while long term criteria would be ones to be reached in, say, about 3 years.

The most important thing in the issue of eco-labelling is to consider what consumers expect from eco-labels, insisted Mr. Yamaguchi. Some customers may want to know what standards are useful in choosing a PC to buy, and some NGOs may want numerical data regarding PCs for comparison between different PC makers. To Mr. Yamaguchi, a simple label alone is not able to meet these different market needs. He therefore thinks that eco-labels can serve as an indicator showing whether detailed environmental information is available. NEC provides on its website various environmental information associated with its products

such as recycability, chemical materials used, and energy efficiency, according to Mr. Yamaguchi.

From the manufacturer's point of view, green procurement has different meanings depending on the so-called "Business-to-Business (B2B)" or "Business-to-Consumers (B2C)"sales, pointed out Mr. Yamaguchi. In B2B, green procurement enables manufacturing companies to *receive* environmental information from firms supplying production materials, and thus it is regarded as a means to making their products environmentally sound. On the other hand, in B2C, green procurement requires manufacturing companies to *release* environmental information of their products to consumers in general.

Inspired by Mr. Yamaguchi's remarks Mr. Weeren commented that basically software had to be programmed in a way that allows for the use of the energy saving options provided by the hardware. As an example he mentioned the bad implementation of the ACPI (advanced configuration and power management interface).

One cannot expect the consumer to weigh the various environmental features against each other in order to find out about the most environmentally friendly product, underlined Mr. Koga. However, that does not mean information collected in something like the environmental data books should not be made available to the consumer. On the contrary, he supported their publication on the Internet. But to ease the decision-making process of consumers, labels were more helpful. As a second tool to easing consumer decision-making Mr. Koga suggested complementing the labels with a ranking system. In his view it would be a good idea to establish an independent agency, which ranks similar products according to their environmental impact. Such a ranking could be based on the information provided in environmental data books or the information provided to the labelling authorities.

Mr. Herman clarified that one could not speak about eco-labels in the IT sector without distinguishing between B2C and B2B sales. At the moment eco-labels do not play a role in the considerations of private consumers. In addition, it would be wrong to assume that consumers visit websites of producers in order to check environmental policies and standards of a particular company in advance of their purchasing decision. Thus one must accept that eco-labels do not play and will not play an important role in the B2C sector. Matters are obviously different in the B2B sector. Here, particularly public purchasers insist on environmental standards that are incorporated into eco-labels.

There are apparently other factors than eco-labels that have a substantial effect on consumer behaviour, thinks Mr. Masaharu Yagishita (National Environmental Training Institute). Naming TV commercials and salesmen as examples of such influential factors, he argued that it is important to see how environmental considerations are incorporated into comprehensive marketing strategies of IT manufacturing companies.

Roundtable Discussion: "What is the Demand for Policy Co-ordination"

1. *Presentation of the Concept*

How does the discussion of the earlier sessions relate to international climate policy? And is there really a demand for policy co-ordination under the umbrella of the Kyoto Protocol? In his presentation, Thomas Langrock (Wuppertal Institute) elaborated on these two questions. First he acquainted participants with the structure of commitments by industrialised countries – so-called Annex I parties. These commitments do not merely consist of a quantified emission limitation target, but also of the more general commitment to introduce policies and measures suitable to reducing greenhouse gas emissions. In this vein, various policies discussed in the sessions before reappear as climate protection policies and therefore these policies could be viewed as a contribution to achieving the commitment of the respective country. Mr. Langrock further explained why it is sensible to include policies and measures in the Kyoto Protocol. Firstly, the inclusion allows to set up institutions which may help industrialised countries to mutually learn about climate protection policies, secondly, these institutions may help industrialised countries to co-ordinate the implementation of climate protection policies and lastly, these institutions could review the success of implementing climate protection strategies.

To further clarify the notion of policy co-ordination Mr. Langrock quoted a study on common action produced by the Annex I expert group. In this study various types of policy co-ordination are explained, such as the parallel implementation of similar policies under some form of agreement. Other forms of policy co-ordination are illustrated in the discussion paper "What is the demand for policy co-ordination under the framework of the Kyoto Protocol?"

More important than the various types is the rationale for policy co-ordination. Why should policies be co-ordinated? Mr. Langrock quoted a case study from the Annex I expert group - the case of common standards for traded products, for example energy efficiency standards for office equipment. The rationale for the parallel introduction of common standards in various national markets is to reduce trade distortions, resulting in a unification of national markets for the standardised good. This in turn could lead to larger product runs and faster market penetration. Thus more energy efficient products would be introduced faster

in the unified market than in a situation where standards are set in each national market. To sum up, the case study showed that if parties commonly introduce an energy efficiency standard they will benefit from the reduction in trade distortion, i.e. a welfare benefit, and they will achieve higher GHG emission reductions compared to the situation wherein individual parties introduce their own energy efficiency standard.

Mr. Langrock then focussed on the present political landscape. In his view, policy co-ordination on an Annex I level, that is including all Eastern European countries, is not sensible, as these countries differ greatly in their respective circumstances. Further, he deduced from the history of the negotiations that imposing the implementation of mandatory policies and measures is probably not feasible. Any attempt will at least meet with fierce resistance by the USA. Lastly, he reported that the parties will most likely establish some kind of learning process based on the national communications they deliver to the United Nations Secretariat. Thus the question arises which role NGOs, Business associations and companies can play in this learning process on the implementation of policies and measures.

To stimulate discussion Mr. Langrock formulated three injections. Firstly, he suggested focussing first on those policies and measures that provide extra-benefits, apart from the achievement of larger GHG emission reductions. Secondly, he suggested exploring the demand for mutual learning on policies and measures **outside** the official framework that will be provided under the umbrella of the Kyoto protocol. And lastly, he emphasized the potential for action of core groups. And particularly, he urged participants to enquire about the potential for bilateral co-ordination between Japan and the EU / Germany.

2. *Discussion*

Before commenting on policy co-ordination Mr. Yagishita took the opportunity to explain the current trends of GHG emissions in Japan. He recalled that Japan committed itself to a six-percent reduction of GHG emissions compared to 1990 levels. Currently, however, the trend goes in the opposite direction as between 1990 and 1998 emissions rose by 5.6 percent. This increase was caused mainly by the transport sector as well as the civic sector. The emission reductions in the industrial sector could not compensate for this increase, so that total emissions rose. According to Mr. Yagishita, this trend is likely to continue. Therefore measures must be strengthened, with particular emphasis on the transport and civic sector. He informed participants that Japan is currently revising its climate protection strategy. In order to do so the effectiveness of various policies and measures is being explored. What is needed

is a policy mix that perfectly blends regulative measures as well as economic instruments such as taxes, emissions trading and voluntary measures.

Time until the start of the first commitment period is limited and therefore, so said Mr. Yagishita, strengthening the climate protection strategy is an urgent matter. Policy co-ordination could prove helpful, particularly, in promoting higher energy efficiency of industrial products traded internationally. The real task, however, is to restructure the industrial structure of industrialised economies. More environmentally sustainable ways of producing and consuming must be targeted. As Mr. Yagishita underlined, decision-makers must realise the inevitable differences in the various national approaches towards more sustainable patterns. So in contrast to the case of traded products, policy co-ordination in the field of restructuring the economy should focus on the exchange of information and learning. It is important to involve actors on very different levels like governments, industry and public authorities in this exchange of information. Therefore the type of workshop organised by IGES and the Wuppertal Institute appeared to him as an ideal means of facilitating mutual learning. For the continuation of the policy dialogue he proposed to focus on particular sectors and to explore how to promote greenhouse gas emission reductions in these sectors. Such an approach seemed more appropriate to him than the broad scope of intergovernmental negotiations. He proposed to focus on the transport sector, as this sector poses a major threat to the achievement of the Kyoto targets for many industrialised countries. In particular, Mr. Yagishita would love to know more about the potential role that the IT industry could play in reducing emissions of the transport sector. The Japanese Government recently published a white paper on the Internet and the environment. Therefore the workshop "International Climate Policy and the IT-Sector" organised by IGES and the Wuppertal Institute was quite timely. Mr. Yagishita closed his presentation by expressing his hopes that COP6 would be successful, since then the discussion on GHG emission reductions would gain additional momentum.

Five advertisements for computers cut out from the English newspaper "Times" served as an introduction to Mr. Herman's presentation. He stressed that in none of these advertisements there was a reference to environmental attributes like eco-labels, energy star labels or the option to return the item after use: "Such is the situation in the B2C market – everyone should bear this in mind".

After this somewhat depressing reminder Mr. Herman elaborated on his idea of policy co-ordination. As a starting point he mentioned the four different types of policy co-ordination

enumerated in Langrock's paper " What is the demand for policy co-ordination under the framework of the Kyoto Protocol?" To him these types can be renamed as implementation, co-ordination, subsidiarity and replication, of which he wanted to focus on co-ordination. To him this field breaks down into six different issues that were all raised in the earlier discussions:

Firstly, it is necessary to involve industry more closely with policy makers. How to do that? Mr. Herman proposed a dialogue between governments and the strategic leading companies. It was not necessary to involve thousands of players, focussing only on the few leading companies would be sufficient. Strategic importance is crucial, as he illustrated using the example of Intel and Microsoft. Intel makes the chips that use electricity, Microsoft has the power to disable/enable power saving modes or not, merely by incorporating energy saving measures into its operating system.

Secondly, a visionary policy with deliverables and timetables is needed. Such a focus vision must be coherent and non-competitive. As an observer to the EU policy-making process, he could report on the WEEE directive and the EEE directive as bad examples. These two directives are competitive, as they each take industry in different directions. Timetables must be medium to long-term, as industry cannot change its products overnight. As an example Mr. Herman quoted the switch to lead-free solder. Japanese companies argue they can eliminate lead within three years, American companies claim they need 10 years.

Thirdly, global regulation for global products on the global market place is needed. Regulation should be light and laws are not necessary, according to Mr. Herman. Why? With very few exceptions of companies addressing regions IT companies produce for the global market. Therefore the IT industry does not want subsidiarity, as would be the case if national governments introduced laws. Why should regulation be light? Simply because there is an unbridgeable difference in speed between the fast moving IT industry and the slow implementation of laws and standards on the other side. As an example he quoted the WEEE directive. According to him, it will take 12 years to move from the first idea to implementation in the member states of the EU. Even non-governmental standardisation bodies like ISO operate painfully slowly. In his view, voluntary agreements are preferable to regulation. If designed properly such voluntary agreements can be much faster than any regulation. However, Mr. Herman acknowledged that all voluntary agreements suffer from the problem of non-compliance of companies that do not sign up to the agreement.

Fourthly, companies that produce environmentally sound products must be rewarded nationally; otherwise companies will not make the investments into greening their production. In Mr. Herman's perception appropriate rewards could be economic and fiscal measures or green public procurement.

Fifthly, citizens must be brought into the debate. Citizens have significant purchasing power. If citizens demanded greener products then there would be incentives to produce in a greener fashion. Also there is a close relationship between rewards by governments and the buying behaviour of private consumers. If governments reward green products, these become cheaper and therefore more interesting to private consumers. Further, government information campaigns are crucial. Mr. Herman did not believe that governments should be neutral in this debate. Instead they should convey messages like "Turn it off!" to their citizens. Further, non-governmental organisations should play a role in promoting climate friendly consumption patterns.

And lastly, Mr. Herman concluded that to enable the IT industry to make a significant contribution towards the implementation of the Kyoto-Protocol, there had to be better co-ordination between industry and government. At the moment there is almost no co-ordination. As an illustration of what Mr. Herman meant by light regulation, Dr. Hujiben explained that the energy star label introduced by USEPA was a good example of policy making. Particularly, the fact that USEPA negotiates the target values with the manufacturers sets an important precedent. He further illustrated the efforts Oce made in lowering the electricity consumption of their copiers and printers. The energy star process has become more important than the product – such was the general feeling and Mr. Weeren added that the internal discussion on energy efficiency within IBM has already had impacts on the design of products that are not targeted by the energy star.

In response to Mr. Herman´s presentation, who had suggested that local governments reward environmentally friendly products and at the same time pledged for laissez faire approaches towards the definition of environmental friendliness, Mr. Langrock enquired whether local governments should reward on the basis of, for example, self-declarations. Mr. Herman argued that indeed self-declarations would offer a good solution. He even claimed the local government might purchase a better product on the basis of self-declaration than on the basis of Blue Angels or other labels.

How can policy co-ordination be facilitated? Various forms are thinkable. First, leading companies could join and start a process suitable to bringing about co-ordinated action,

second, governments could start such initiatives and last, similar to the policy dialogue initiated by IGES and the Wuppertal Institute, independent non-governmental organisation could serve as moderators. In the survey that was conducted during the first phase of the policy dialogue the responding companies had clearly expressed their preference for independent initiatives and industry-only endeavours - informed Dr. Ott. To Mr. Langrock industry-only approaches seem inappropriate. Instead, the energy star label may provide a pattern for replication. There the US government invited companies to negotiate the label.

To Dr. Jung the workshop had shown that it is first of all necessary to learn about the differences in the implementation of PAMs and the emission profiles. Further the workshop had underlined the importance of industry involvement in a learning process. Only industry has the data that is necessary to learn about the scope for policy co-ordination. The actual policy co-ordination, however, comes in later.

To Mr. Yamaguchi, one of the most significant points revealed by the workshop was the importance of information sharing. How can the IT-industry convey necessary environmental information to consumers in a most effective way? Mr. Yamaguchi stated that in discussing this question international co-ordination is necessary to avoid confusing consumers, and that certain direction for actions needs to be clarified soon as things are changing rapidly in an IT-society.

Mr. Koga viewed the workshop as a valuable forum involving industries, governments, and research institutes that could present innovative ideas and recommendations. Mr. Koga expressed his hope that IGES and the Wuppertal Institute would further develop their collaboration on events such as the workshop in the future. Then Mr. Yagishita followed Mr. Koga by putting into words his expectation for the continuation of the workshop.

To Prof. Peter Hennicke (Wuppertal Institute) the discussion showed that, as of yet there is no real understanding whether the Internet is a benefit or a cost to society. This very basic question could apparently not be addressed in this workshop. This lack of understanding makes it difficult to judge which vision policy makers should develop. He suggested that in order to broaden the horizon of the discussion on the Internet institutes like the Wuppertal Institute and the Institute for Global Environmental Strategies should join efforts and develop further the database on the Internet. Then, in a second step, the institutes should make public their findings and discuss them intensively with policymakers within governments and decision-makers in industry.

Finally, Prof Morishima concluded the workshop. In his view the workshop had only been the starting point of a series of action taken by IGES and the Wuppertal Institute. Prof. Morishima expressed his hopes that the research project of IGES and further work by the Wuppertal Institute will place the institutes in a position that allows for the formulation of policy recommendations. Further he hoped that the two institutes would jointly proceed in these attempts. Prof. Morishima thanked the participants, particularly those from industry. Then Dr. Ott once again thanked all participants and closed the workshop.

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