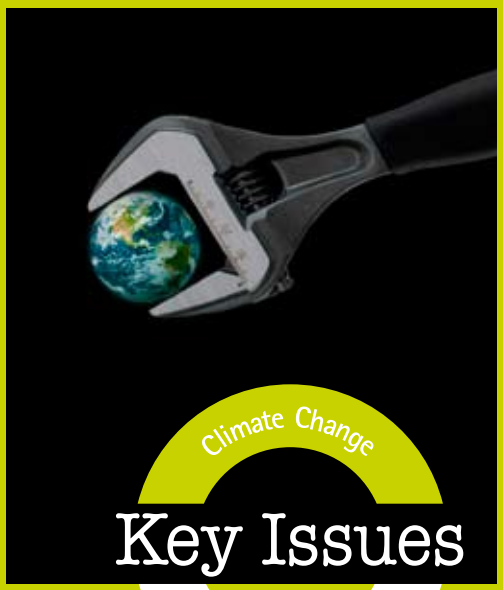




Climate Change

Key Issues

Swedish Society for Nature Conservation

Key issues for climate change











Content

The Key Issues for Climate Change project: The Swedish Society for Nature Conservation (SSNC) Key Issues seminar series was organised in 2009 and took place in Stockholm and at COP15. Sound recordings, individual seminar reports and additional material are available at www.naturskyddsforeningen.se/keyissues

Key Issues project coordination: The Key Issues seminar series and reports were coordinated by Niclas Hällström, who worked as Climate Expert for SSNC 2008-2009. While continuing collaboration with SSNC, he is presently setting up an independent initiative – "What Next?" – in parallel to the work on climate (www.whatnext.org).

Layout and photomontage: Espmark & Espmark
Print: åtta.45, Stockholm
Order No: 8 9370
ISBN: 978-91-558-0028-4

Produced with economic support from Sida. Sida has not participated in the production of the publication and has not evaluated the facts or opinions that are expressed.

Preface

In the year leading up to the Copenhagen conference in December 2009, the Swedish Society for Nature Conservation identified nine themes of particular relevance for climate politics, and the United Nations Framework Convention on Climate Change (UNFCCC) negotiations in particular.

In a series of seminars – "Key Issues for Climate Change" – we gathered government reprentatives and negotiators, civil society organisations, researchers, indigenous peoples, social movement activists, UN civil servants and media people from all continents with an aim to highlight the trickiest issues and help guide our own policy formulation.

We wanted a diversity of opinions and opportunities for open debate and reflection. We also wanted to provide arenas where important actors from different backgrounds would meet and engage – to facilitate meetings that may otherwise not take place. And, we wanted to tackle the issues at their roots, and thus also go beyond the often constrained debates within the formal negotiations.

The Copenhagen meeting ended in fiasco. We did not get the ambitious, binding agreement we had hoped for. And even worse, we saw the very foundation for the climate negotiations shaken and threatened – with most of the developed countries opting for abandonment of the Kyoto protocol's aggregate, binding mitigation targets and instead proposing a pledging system with such unambitious commitments that the world would be heading for a 3-4 degree warming or more. The Copenhagen meeting also resulted in untransparent and undemocratic processes where a small number of countries negotiated in secrecy – not on behalf of the others – and in the end tried to impose the highly unsatisfactory Copenhagen Accord. Rather then making a break-through with substantial commitments and cooperation for our joint survival, we saw a further break-down of trust in Copenhagen.

The world needs to get back on track, and to do so as fast as possible. When reflecting on the issues and agenda ahead, we realise that the discussions and conclusions from our Key Issues seminar series are as relevant now as they were before Copenhagen. In a formal sense, nothing has really happened – the Copenhagen accord was only taken note of and the center for negoatiations is and should be the UNFCCC. All the core issues still need to be resolved, and be resolved in a way that really respond to the immense challenges facing us.

We therefore find it of relevance to provide you with this compilation of our Key issues seminar reports, as well as our policy positions from immediately before and after the Copenhagen meeting. On the substantive areas – shared vision, mitigation, finance, technology, and adaptation – our positions remain intact.

When examining our reflections on the legal framework and architecture before Copenhagen it is clear that our worries indeed materialised – the attempts to kill the Kyoto protocol and undermine elements of the convention itself (See our op-ed from 12 Nov on page 206). Our submission to the European Environmental Council in March 2009 provides our view on the way forward towards and beyond the COP 16 meeting in Cancún, as well as our critique of the Copenhagen Accord.

While the focus must be on a transparent UN process, we do see an opportunity for the most ambitious and responsible countries – in both the north and the south – to take a lead and move the others by setting examples and showing how being ahead does not mean costs but rather gains – these are real investments, both for our common future and for the countries themeselves.

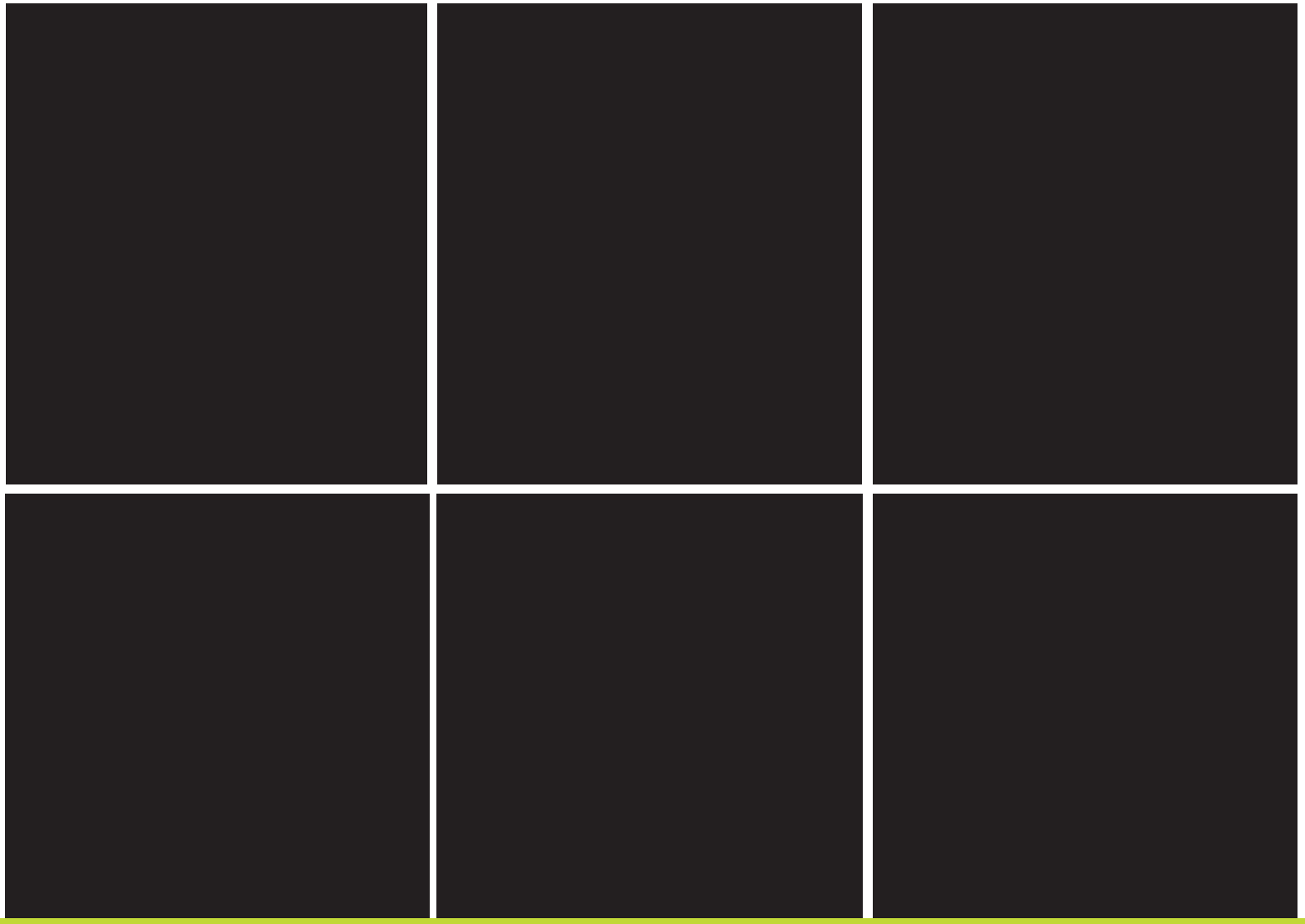
We are promoting the idea of a "Global Marshall plan" for climate and development with a system of global feed-in tariffs for rapid expansion of renewable energy. This should be part of the UNFCCC framework and funded though public finance in a global fund very much in line with the climate convention. One way to push towards this win-win

approach might be for a number of countries to immediately set up such a pilot scheme and push for a rapid scaling up and inclusion in the UN framework.

We need genuinely cooperative solutions that at the same time are bold enough to respond to the integrated challenges of climate change and development. And we need popular mobilisation that forces our governments and corporations to take responsibility and ensure solutions that are equitable and effective.

Svante Axelsson
Secretary-General
Swedish Society for Nature Conservation

See seminar reports no 5 and 9 in this compilation as well as our special compilation *A green Energy Revolution for climate and development: Visions and arguments*: www.naturskyddsforeningen.se/keyissues



Seminar report from Seminar no. 1:
The double challenge

– How tackle the right to development and the climate crisis simultaneously

Any successful solution to the climate crisis will need to also tackle global injustice, necessitating an integrated view of multiple challenges. This is also a precondition for bridging the great divide that exists in the climate negotiations between poor and rich countries. What are the implications of a holistic approach to climate, development and global justice? How do we bridge the gap between policy and science as well as between the rich and the poor?

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues1

Participants: Svante Axelsson, Executive Director, SSNC, Johan Rockström, Executive Director, Stockholm Environment Institute Munir Akram, former UN Permanent Representative for Pakistan and Chair of G77/China at the 2007 Bali negotiations, Anders Turesson, Head of delegation and Chief negotiator, Ministry for Environment, Sweden, Tariq Banuri, Director, UN Division for Sustainable Development, Johan Schaar, Director, Commission for Climate Change and Development, Christine Loh, Executive Director, Civic Exchange, Hong Kong

Moderator and project coordinator: Niclas Hällström, SSNC The seminar took place: 11 March 2009, Kulturhuset, Stockholm

www.naturskyddsforeningen.se

The double challenge

– How tackle the right to development and the climate crisis simultaneously

Svante Axelsson
Welcome remarks

Ideally, everyone should be able to follow and influence how negotiators will handle, and hopefully solve, crucial climate-related issues. But for that, understanding is needed of what those issues are. As SSNC itself does not have all the answers, these seminars is about listening to different perspectives and getting feedback on ideas.

The title for this seminar is "The Double Challenge". Which double challenge is that? Indeed, the challenges are now so numerous that the answer may not be immediately obvious. One double challenge is of course that of the financial crisis and the climate crisis. We have to grasp the opportunity to solve these in tandem.

Another double challenge which is crucial for meeting the two degree target is combining ambitious domestic reductions with support for reductions in developing countries.

But the main challenge remains that of using climate policy as a way to promote development in developing countries. Increasing energy consumption is essential as people move out of poverty. How, then, can the growing need for energy in developing countries be met without increasing emissions of greenhouse gasses?

Perhaps, in a sense, these multiple crises are a good thing. Perhaps we need them; perhaps the more problems exist, the stronger will be the driving forces for change. That change, of course, will only be possible in the presence of synergies between solutions to several crises; yet such synergies are readily apparent. At the same time, we need to be aware of the risk that there will be false synergies: many countries, including Sweden, once hoped that the Clean Development Mechanism would be a win-win solution, and today we know that it is not. It is rather lose-lose; CDM is deeply flawed as a tool for mitigation as well as for development.

One fundamental challenge concerns the raising and channelling of the huge financial resources needed. We need a Keynesian "Marshall plan" for climate investments in developing, as well as industrialised, countries, including money for adaptation, forest protection, and increased development assistance in order to fulfil the Millennium Goals. Altogether, amounts in the order of twice, three times, four times the current global aid budgets will be needed.

We also need to find the ways in which policy makers can influence and direct the huge private investment flows so as to ensure climate-friendly development in developing countries; for example, through public investment, policies, regulations and effective institutions. While aid is difficult to successfully implement, monitoring climate financing will be even more challenging; and so there is a real danger of unproductive investment with no developmental gains.

This seminar series, then, is about making optimal use of the window of opportunity now before us. It is about finding out what institutions and measures help us to simultaneously solve multiple crises. What those solutions might be, I do not know, though I hope that we will find out.

Niclas Hällström
Introduction

This seminar is the result of collaboration between the SSNC and the Stockholm Environment Institute, of which Johan Rockström is director. Our objective has been to support the so-called "integrated approach to climate and development" spearheaded by Tariq Banuri. That is, in order to overcome the crux issues before the international community we need to bring together a group of people representing many different viewpoints, backgrounds and interests.

This seminar coincides with a major scientific conference in Copenhagen on the latest, and increasingly alarming, climate science. This conference is convened with the explicit aim of influencing climate policy in the lead-up to

"Oceans, forests, glaciers, temperature, ozone; every element of the earth's system is pointing decisively in the wrong direction"

Johan Rockström

the decisive December summit, which also is to take place in Copenhagen. SSNC, together with SEI through Johan Rockström and the international participants in today's seminar, will also conduct a similar workshop next day in Copenhagen.

Johan Rockström
Tipping points and the right to development

The grave situation that we are in calls for dialogue, not monologue; consequently, I will only bring you a few highlights on the latest science and its implications for Copenhagen.

Two very profound frustrations have emerged in the scientific community. First, the dichotomy between "alarmist" versus "balanced" scientists. While economists are expected and even required to present worst-case scenarios, as soon as environmental scientists even get close to doing the same, they are branded as scaremongering neo-Malthusians, as the very notion that we are heading towards disaster is taboo.

By now, the time when we needed to rely on computer models and hypotheses is past. Increasingly integrated, robust, and evidence-based science shows that we are pushing the planet very close to planetary-scale thresholds. Oceans, forests, glaciers, temperature, ozone; every element of the earth's system is pointing decisively in the wrong direction, and even the average scenarios are looking dangerous.

We may be propelling the planet into a wholly new geological phase – out of the stable conditions of the Holocene, which has lasted since the end of the last ice age and has provided the thriving basis for civilization as we know it, into some new and certainly undesirable state. The planet may well go from being our friend – buffering, protecting, giving ecosystem services, stabilizing the planet under our negative influence – to becoming our enemy, accelerating warming beyond our control. Yet as soon as such notions are even mentioned, the scientist doing so is accused of being an environmental extremist. That is the one major frustration.

The other is the current, and very dramatic, divergence between politics and science. In the political sphere, any and all commitments are made on the basis of what is deemed politically possible: there is compromise, negotiations, and pragmatism. And all the while, the latest science is moving ahead like an avalanche. As Professor Katherine Richardson stated in her opening address at the Copenhagen scientific conference: "I will be honest and say, I have read all of the abstracts… in the presentations relating to the development of the climate system as a whole, there is little, if any, good news." Seen in that context, policy makers are more and more losing touch with what science tells us is necessary.

What are then the central points of that latest science? First, the IPCC, although clearly a fundamental platform for climate science and with many of its scientists participating at the Copenhagen conference, has unfortunately dramatically underestimated sea level rise. The IPCC cautiously estimated sea level rise at 40-50 cm by 2100; however, observations show that sea levels are now rising twice as fast as that estimate implies, and sea level rise in the current century may thus be twice as large as previously predicted.

In addition, our models are becoming much more refined and better at capturing the multiple complexities of sea level rise. In the summer of 2007, the Arctic ice sheet essentially collapsed, dropping almost 40% below the 1979-2000 average. This was the ultimate wake-up call for humanity, a clear signal that we are destroying that massive as well as globally significant ecosystem; but it also served as a warning for the scientific community that the models being used at the time were incomplete. None of those models pre-dicted what actually happened. None of those models incorporated the fact that environmental change has a way of initially occurring quite slowly, until some threshold is reached at which point change occurs very abruptly.

By now, however, such features have indeed been included in the models, and results show that we can no longer exclude sea level rise of 1-2 metres until 2100, and 5-7 metres until 2200. Note that this is not a worst-case scenario, but a

middle-of-the-road estimate for business as usual. Obviously, a planet where that kind of sea level rise occurs will be wholly different from the one we inhabit today. Yet normally in politics, what happens in two centuries is not considered, despite the fact that the cultural linkages of our current civilization run several thousand years back. Second, there has been much study of ocean acidification, an aspect which the IPCC actually did not even mention in their 2007 Fourth Assessment Report. One quarter of total incremental CO_2 emissions is currently absorbed by the oceans: a massive, free ecosystem service. Some of that absorption is administered by living organisms for instance using carbon for shells; therefore, coral reefs and indeed all marine life is a key element of climate stabilization. Unfortunately, because of CO_2 emissions, ocean pH is now declining very quickly, endangering that vital ecosystem service. Here is incidentally the ultimate proof that the sceptics are mistaken – anyone can put a pH stick into the ocean, and so the ongoing acidification of the oceans is clear, unambiguous evidence that humanity is the major cause behind massive transformations on the planet.

Third, the science on tipping points. There is an entire session at the conference on analyzing the risks of large-scale thresholds in the earth's systems. To state only a few examples, though there are many more systems that are threatened, the entire Amazon system may tip over to become savannah instead, the African and South East Asian monsoons may be disrupted, and we may be inducing accelerating, abrupt glacial melting.

Thus, in summary, the situation is graver than previously thought. What are then the implications for Copenhagen? The analysis undertaken by the SEI is based on taking seriously both the science and the concept of climate justice, meaning that any regime has be based on the responsibility of causing the problem as well as the capacity to solve it. Our con-clusion is then that the only just solution is for coun-tries like Sweden to take on mitigation commitments beyond 100% already by 2020.

That is very extensive. We have had interactions with representatives of the Swedish government, and while there is respect for the science, that target is clearly many orders of magnitude away from current political realities. Thus, the combination of phasing out fossil fuels globally within two generations and taking climate justice seriously is an explosive one. Having said that, achieving such an objective is likely not all that difficult. Domestic mitigation, taken as far as possible, may be combined with measurable, verifiable and reportable commitments on investment, financing and technology transfer in developing countries.

As a final note, it was very encouraging to see the Danish government, including the Prime Minister, attending the scientific conference in Copenhagen and showing strong commitment to listening to the science and including it in the negotiations. Recent science can influence, and must influence, the way forward. It is also, in my mind, the only way to bridge the divide between the rich and the poor countries of the world, because it is now clear that both mitigation and adaptation must be done globally, and that everyone will have to contribute.

Munir Akram
Integrating climate and development – a perspective from the South.

Remember that the 2007 negotiations in Bali nearly failed, the central cause being the lack of understanding from the part of developed country negotiators that development remains the primary objective of developing countries. While for the G77, which I represented, the fulfilment of our responsibilities on climate change was certainly a major concern, the paramount priority was, and is, growth and development. No matter what threats we face in the coming decades or centuries, any impediment to the reduction and elimination of poverty, whether or not it springs from an unequal trading system, financial system or climate treaty, is unacceptable. Therefore, any strategy on climate change will have to accommodate development.

In the poorest countries, a growth rate of 8-10% will be required to eradicate poverty in any reasonable period of

"...increased energy use and emissions in developing countries is a political fact that has to be accommodated in the negotiations."
Munir Akram

time. Thus, the growth path for developing countries would have to be steep, while the growth of developed countries would need to be much lower. This would be possible without sacrificing acceptable living standards in developed countries.

Yet any economic growth rate is very tightly linked to per capita energy use, and so, if a growth path of 8% or more is to be achieved, energy use in developing countries will have to be multiplied by a factor of at least four or five. The central issue is then how such an expansion of energy use can be accommodated by an emissions reduction regime, as well as by ecosystems in developing countries?

That question, although requiring much greater research and study, has to some extent already been addressed by a group of diplomats, academics and civil society representatives (including SSNC) brought together by Tariq Banuri last December under the name 'Commission on Integrated Development and Climate Solutions'. Our conclusion was that developed countries can indeed reduce emissions while at the same time growing moderately; and although developing countries may shoulder much lower responsibilities, they should adopt technologies that allow development with the lowest possible growth in emissions. In any case, I believe that increased energy use and emissions in developing countries is a political fact that has to be accommodated in the negotiations.

In addition, it is clear that adaptation to climate change must now form a part of any development strategy and that synergies can and must be built between the two. Also, as Johan has just mentioned, ecosystems ranging from the oceans to the skies will be, and are being, affected. We need to assess how changing ecosystems, impacting upon groundwater, agriculture, groundwater and so on, affect development priorities.

Technology will be an obviously critical factor in achieving growth with the lowest possible emissions. Among existing low carbon technologies, some are already viable while others are only in the very earliest stages of research and development. Yet while developed countries have the capacity to develop and adopt such technologies, developing countries will require assistance in order to transfer and apply them to the largest extent possible. Therefore, it seems that technology will have to be researched, applied and governed in an exceptionally focused way.

Finally, and most importantly, a few words on finance. Today, the entire structure of development finance is broken. Every major development effort, including the Millennium Development Goals, climate change, biodiversity conservation, R&D, and technology transfer, is grossly underfunded. The financial crisis is not the cause of this, but it has made things worse; there is a fear that because of the crisis, pursuing any goal except re-establishing growth in developed economies will be considered impossible. That may become a political reality in the coming months, and so it is crucial for us all to insist that climate change and development is an essential part of any restructuring of the international financial and trading system. Moreover, it will not be possible to sustainably revive the global financial system without the participation of developing countries.

As markets have obviously failed to save even the market system itself, private flows and market mechanisms will not suffice to fund the commitments of the United Nations Framework Convention on Climate Change (UNFCCC). Now, allocating public funds for the financing of development and climate change is only a matter of political will in the large countries. Clearly, when there is a crisis, developed country governments are willing to commit huge funds; therefore, we must present the case that unless they act similarly on climate and development, we are headed for disaster within five, ten, or fifteen years from now. Remember, even if an agreement is reached in Copenhagen, there is no certainty that it will have any real impact; only if developing countries stand firm, and such a political transformation takes place in the developed world, will the Copenhagen treaty be significant as well as feasible.

"Unfortunately, findings seem to become obsolete very quickly; yet policy makers cannot change their positions on a monthly basis."

Anders Turesson

Anders Turesson
The Swedish government position in the negotiations

Negotiating an agreement on climate is an enormous task for the world community, and certainly a central priority of the Swedish government. Because of the upcoming presidency I am getting into the habit of representing the European Union as well as the Swedish government; and so I will now summarize the EU views on climate policy.

Those views are firmly based on a few imperatives. First, global emissions need to be reduced in accordance with the IPCC Assessment Reports. Unfortunately, findings seem to become obsolete very quickly; yet policy makers cannot change their positions on a monthly basis. Importantly though, we will not be unresponsive to any new results that may emerge in between the IPCC reports.

Based on the assessments that have been done to date, the EU has stated that we must reduce global emissions by 50% within the next 41 years. Many countries will be including that figure in their objectives; however, the EU sets 1990 as the baseline year, meaning that by 2050, emissions must drop much further than 50% compared to today's levels.

Second, regardless of mitigation strategies, climate is already changing and will continue to change in the future. Adaptation will therefore be necessary, and it must be dealt with in a spirit of solidarity. Rich countries need to assume responsibility for past emissions; meaning, to a large part, financial responsibility.

Third, the issue of development. All countries will need to restructure their societies into low-carbon economies; yet no society will be able to reduce its emissions by becoming poorer, and growth is needed in industrialised countries as well. The task before us is rather to break the link between emissions and energy consumption, development, and growth.

The good news is that this is possible; the necessary technologies are to a large extent available, and a few countries, including Sweden, have already demon-strated that growth without additional emissions is possible. Since 1990, emissions have dropped by 9%, while the economy has grown by 44%. This proves the potential of the Swedish carbon tax, as well as that of other economic instruments.

However, the problem is global, and solving it will take more than a single country, or even a group of countries. A robust regulatory framework is needed, building on existing institutions such as the UNFCCC. Now, a few basic principles for creating such a framework were formulated in Bali. Developed countries, however these will be defined, will need to face binding commitments on emission reductions and will be assisted in meeting them by the various instruments instituted under the agreement, such as the carbon markets. It is imperative that we reach these targets in an efficient manner, implying that cost-effectiveness will be a central principle for both developed and developing countries.

The task for developing countries is simply to choose the low carbon growth path. There will naturally be a need for technological and financial assistance, but what is needed most of all is the political ambition to manage such a shift, as much of the technology is in many cases already available, profitable and surprisingly low-tech. The EU expects developing countries, particularly the more advanced developing countries, to design strategies for reaching the low-carbon society, with implementation of such strategies being "measurable, reportable and verifiable", as required by the Bali Action Plan.

Question, Christine Loh: What are the domestic policies that will need to be implemented in Sweden and the rest of the EU in order to make sure that any emissions reductions agreed upon in Copenhagen are actually implemented?

Answer, Anders Turesson: Sweden has good experience with economic instruments, and I believe that we are going to pursue that route. But it is fair to say that carbon taxes alone will not suffice; we need a multitude of different policies and

"What is needed is a publicly funded global investment program in renewable energy, starting from the poorest countries."
Tariq Banuri

measures, such as public awareness, public investment and R&D. We need to use all instruments that we know of, and some that we do not yet know of, but the main thrust will be towards relying on basic instruments and the ability of the market to adapt to new situations, given the right incentives.

Tariq Banuri
Climate action with a human face

The Human Development Report of 2007 underscores Ambassador Akram's point about the link between development and energy. The correlation between any of the Development Indicators used in that report and per capita energy consumption is nearly complete – up to a point of roughly 200 GJ/person. After that, there is no link between increased energy use and the Human Development Indicators.

All of the developing countries have low energy use, and thus score low points on the Human Development Index. In contrast, all of the developed countries consume huge amounts of energy, and as a rule, far more energy is used than is needed to uphold quality of life. The conclusion is then that poor countries need more energy; rich countries do not.

This is a fundamental difference. When no more energy is needed, much can be accomplished simply through improved energy efficiency. But when you do need more, energy use will have to increase regardless of what efforts are made on efficiency. For instance, while as stated Sweden increased GNP by 44% between 1990 and 2007, China grew by roughly 260%, also nearly tripling domestic energy consumption.

Potential for energy efficiency is large even compared to other measures. A McKinsey study on the cost-effectiveness of mitigation measures rated projects from the cheapest to the most expensive; the most cost-effective measures are the ones where there are "negative costs", meaning that investment saves money. It turns out that most of these are related to efficiency.

The cheapest measures among the ones with positive costs are associated with renewable energy. But one must keep in mind that this does not mean that renewable energy is competitive, or that developing countries will find it worthwhile to invest in it. Consider the example of electricity. In much of the world, average cost of electricity is on the order of 6-7 cents per kWh, yet that is to a large degree due to the use of cheap coal, which has a cost of 3-5 cents. What about electricity from renewable sources? In the industrialised countries, wind costs about 6-8 cents; but in de-veloping countries, it costs 12-15 cents, and solar power costs 25-45 cents.

Now, more than half of the population in a developing country may not be able to afford electricity which is more expensive than 3 cents per kWh. Consequently, if modern energy services are to be offered to the poor, whose incomes may not much exceed one dollar per day, they need to be subsidised; and indeed they ought to be, as subsidies is a good thing when used to benefit the poor. Clearly, given these constraints, it is certainly not feasible for developing countries to levy any carbon taxes.

Our objective, rather, will have to be providing the population in developing countries with affordable renewable energy. Even if price discrimination can be applied so that energy can be sold to the richer part of the population at 15-20 cents, the average price will be perhaps 7-8 cents. So if the cost of producing renewable energy is greater than that, either the price will have to become so high that there will be no buyers, or the energy will have to be subsidised, causing great public deficits.

We may conclude that unless the costs of renewable electricity drop, there will be no expansion beyond the first pilot plant. Crucially, a carbon tax will not be able to solve this problem. What is instead needed is a publicly funded global investment program in renewable energy, starting from the poorest countries. If implemented correctly, such a plan will bring two benefits. First, it will facilitate development, raising incomes and purchasing power, including for energy.

Twenty years ago, the Chacaltaya glacier had 16 metres of ice and was used as a ski resort; today, it has almost completely disappeared.

Johan Schaar

Second, as economies of scale are attained in the renewables sector, costs will start to come down.

I am confident that Copenhagen will be a success, because at all levels there is now a great deal of commitment. Nonetheless, a major gap has emerged between rhetoric and action. When you get right down to it, how many countries actually met their Kyoto commitments? I count only one country: Sweden. Developing countries are now in many cases viewing the Kyoto Protocol commitments as essentially rhetoric with no real action to back it up, and figuring they can do the same.

Because the cost issue is fundamental, even if developing countries also set emission targets, it will have no effect unless renewable energy is made competitive. The main task in Copenhagen should be devising a global investment program with the aim of lowering the costs of renewables, building upon the framework established at Bali of "mitigation actions by developing countries supported by finance and technology in a measurable, reportable and verifiable manner." In my view, the only way in which that can be done is through a global investment program, directing the developing economies into a new development path while still protecting the weak and the vulnerable.

Johan Schaar
Climate and development, aid and adaptation.

I head the Commission on Climate Change and Development, which was initiated by the Swedish Minister for Development Cooperation Gunilla Carlsson. The Commission has twelve members representing science, international organizations, civil society, private sector and so on. Our point of departure is the fact that because climate change is already affecting the poorest countries, the focus can no longer be only on mitigation. A report will be released in New York on the 14th of May, and we are planning an event in Stockholm on the 12th.

The Commission has met three times, each time in a development context: in Cambodia, Mali and, last week, in Bolivia. In that country, impacts from climate change are already very visible. Twenty years ago, the Chacaltaya glacier had 16 metres of ice and was used as a ski resort; today, it has almost completely disappeared. Also, at the time of our visit, there was an unprecedented epidemic of dengue fever in the lowland city of Santa Cruz, infecting forty thousand people and overwhelming the public health system. Furthermore, it appears that climate change is altering the patterns of el Niño and la Niña weather phenomena, necessitating new farming practices.

What are appropriate principles when considering the design, in Copenhagen and beyond, of mechanisms and policies for development-friendly climate measures? As was very clear in Bolivia, the impacts of climate change are extremely context-specific, meaning that climate change will have very different effects across different countries, ecosystems, political systems and so on. Thus, adaptation measures need to be viewed as a very broad set of policies, spanning from specifically climate-related projects to broadly building the adaptive capacity of vulnerable people and countries.

The basis for adaptive capacity is wealth, health, ability to work, education and correct information, and governance and institutions; wealth meaning the assets that you need to be able to cope with crises. In rich countries, such an asset base is usually available, either through direct access or through insurance. In poor countries, it is often not, and will need to be provided or replaced by governments. The foundations for adaptation are clearly also to a large extent the foundations for human development; thus, climate change policies should be integrated into a development framework.

In Bolivia, all this can already be translated into concrete experience. For example, as the glaciers disappear, the water reservoirs supplied by these run dry, causing water and hydro power shortages in major cities. Building new water reservoirs for capturing rainwater is an example of climate-specific investment in infrastructure, as is the development of new drought and heat resistant crops for agriculture.

"In order for negotiators and politicians to truly act in the interests of the people, that people must energize them and enable them to do so..."
Christine Loh

So what kind of financial mechanism is needed? It is clear from the Convention that financing has to be in addition to commitments on development assistance, and several interesting and concrete mechanisms are being discussed. The financial mechanism, I think, needs to have a representative governance structure and be sufficiently flexible to allow countries the choice of what projects to finance. Finally, because of the aforementioned context specificity, it needs to allow access to financing at the local level, for example through national-level trust funds from which financial resources may be received by local government or local civil society.

Christine Loh
Looking for synergies and breaking the impass between the North and the South

Johan Rockström has really given us a reality check. We now know what the science is, and it is explicit; so what are we going to do with it? As we heard, Anders Turesson of the Swedish government gave what you might call the standard official line: while the science is useful and while it will be taken into account, policy goals are still based on the IPCC Fourth Assessment Report. That sort of stance seems to be typical of politics – not only in the EU, of course, but of politics worldwide, including in China.

In some cases, politicians are very quick to pick up new and relevant information, as we have seen with the financial crisis. On other occasions, the urgency is not as apparent, and all there is to be seen is some half-hearted effort to "paste" the new information onto measures already being taken.

In the case of the financial crisis, the idea of a solution seems simply to be throwing money at the problem, without really knowing if it will help, or even what went wrong in the first place. At least with climate change, science is clear about what the issues are, and to some extent what is needed to resolve them. The crucial question concerns our choice of method for driving down emissions in an unprecedented manner.

That is, how do we take the science and make it a part not only of the negotiations in Copenhagen and beyond, but of global public dialogue? In order for negotiators and politicians to truly act in the interests of the people, that people must energize them and enable them to do so; the planet will have to be repre-sented by the people, because obviously the planet cannot directly participate in the negotiations. How do we spread the message that what should be central at the negotiating table is not what politicians may or may not be willing to commit to, but what is actually possible without risking the collapse of civilization? How do we create the opportunity for negotiators to work with the planetary boundaries in mind?

As we have heard, one very important issue concerns development and providing energy – clean energy – to the world's poor. In poor countries, development is not really about materialism, but about introducing basic empowerment and choice: schooling, basic healthcare, water, greater availability of energy. Thus, one need not assume, when discussing development, that the rest of the world wants to live like Europeans or Americans. However, from the way developed countries talk about development, it sounds like what developing countries want is money; and so unfortunately, there is little indication that governments in the North have grasped, or perhaps rather remembered, what development is really about.

Also, technology alone is not the answer; climate change needs to be countered by policy as well. This was the essence of the question I put to Mr. Turesson. For example, improving energy efficiency is rarely even mentioned and does not seem to be viewed as very attractive compared to developing renewable energy and other advanced technologies. Now, Sweden is already a very energy efficient country, but could likely go even further. What are then the policy tools required to continue to drive efficiency?

The point is that being already developed, Sweden and other rich countries have the unique capacity to show the rest of the world that mitigation does not have to be about

some new, advanced technology; it could simply be about implementing policies for energy efficiency. As Mr. Turesson said, we will be required to use all the tools at our disposal, including policy tools. If Sweden could manage to do so, it would set an example to the developing countries. On the other hand, failure to do so would indicate a lack of determination on fighting climate change.

Finally, for those with an interest in the most current Chinese climate policy, it revolves around three central ideas; objectives that will no doubt take many years to reach, especially if developed countries do not set an example. The first objective is to greatly improve energy efficiency. China is currently nine times less efficient than Japan, so the gains to be realized in terms of mitigation are huge. The second one is the idea of "co-control", meaning integrating climate mitigation with other policy areas, such as air quality and health, so as to achieve synergies and multiple benefits. The third idea is that of China as a "circular economy" where waste has been eliminated. Concrete plans on how to achieve this are admittedly somewhat sketchy at the moment; on the other hand, China is the first country that has made achieving the circular economy into national policy.

Being a developing country, China may be good at conceptualization, but still has a long way to go in terms of implementation. This seems, however, to be the case all over the world: politicians are incredibly poor at being specific about what policies will be needed in order to drive change. Just the fact that the needed technologies are available is, as Mr. Banuri has said, not enough: we need to facilitate adoption of those technologies. That is why advanced countries such as Sweden must now step up and show us policies that work: to demonstrate to developing countries, including China and India, that fighting climate change is doable.

Panel conversation and interaction with the audience

Question. Maria Schultz, SwedBio. **What role does biodiversity, ecosystem services, and the resilience of ecosystems play in climate change mitigation and adaptation?**

Answers. Johan Rockström. The scientific evidence is piling up that ecosystems and biodiversity are absolutely fundamental to climate change. To a very large extent, the reason why we have only seen a one degree warming so far is that half of our emissions have been absorbed by terrestrial and oceanic ecosystems. Indeed, the cumulative CO2 emissions of mankind are small compared to the enormous amounts sequestered in living ecosystems. That, unfortunately, means that the main "battleground" for whether or not we will be able to stabilize the climate is not only to what extent emissions will be reduced, but how these carbon stocks will react to rising temperatures.

Beyond that, the planet's inbuilt resilience, which provides overall protection against turbulence and shocks, is being eroded because ecosystems are being degraded and biodiversity is being reduced worldwide. Biodiversity and ecosystems are not only the toolbox for human development, but also for keeping the planet on a stable trajectory.

Finally, we are not negotiating a climate agreement as much as a global agreement for sustainability, because if overall sustainability is left out of the picture, there will inevitably be feedbacks from the planetary system, pushing the world out of a stable trajectory. Thus, it is unfortunate that the only issue related to ecosystems and biodiversity included in the negotiations is deforestation. There are other challenges before us.

Johan Schaar. The protection of ecosystems and ecosystem services runs throughout all the aspects of adaptation to climate change, not least because poor people are in an immediate sense dependent on ecosystems for their livelihoods. For example, the peasants of the Altiplano at 4000-5000 metres above sea level have at their disposal 300 species of potatoes that are not currently used, but which represent the immense potential for biodiversity-based adaptation.

Question. Christina Engfeldt, FAO Sweden. **There has been some talk of the necessities of life, yet no one here has so far mentioned hunger, which is the most basic of all needs. One sixth of the world population is currently suffering from chronic undernourishment, despite us already producing more food than what would be needed to feed everyone. And yet the main challenge is being able to produce enough for all needs in the future. Does anyone wish to comment on the link between food and climate?**

Answers. Munir Akram. Hunger is an integral part of poverty, and any sustainable strategy for development and growth would be worthless without addressing hunger and poverty. Indeed, the first Millennium Goal is to halve hunger worldwide.

Christine Loh. In addition to hunger, we need to address the right to water and population rise. However, I do not think that the food issue will drop from the agenda. Last year, many Asian governments were taken by surprise by the rising food prices, having in many cases shifted production of staple rice from domestic markets to export markets. The price spike, however, proved a wake-up call that even in today's globalized economic environment, there can be uncertainty and turbulence. Interestingly, the Singapore government now actually calls for citizens to eat less meat, and I am curious about the possibility of any Western government doing the same, especially since reducing meat consumption implies exactly the kind of synergies and co-benefits that China is now striving to achieve in public policy.

Johan Rockström. On the issue of co-benefits, there is potentially some good news to be had from the agri-cultural sector. Currently of course, agriculture is a great case for

concern, because it is heavily dependent on fossil fuels; a new, doubly green revolution is needed, making agriculture more productive while at the same time enhancing sustainability. The good news is that the knowledge is there: we know how to create an agricultural sector with multiple benefits in productivity and sustainability as well as in terms of carbon sequestration. Essentially, we could transform agriculture from being a net source of carbon, to being a sink.

In the vast majority of the world's farmland, especially in the poor regions, agricultural productivity is currently very low, due to the low amount of organic soil matter. If that productivity could be doubled in Africa and parts of China and India, estimates show that this alone would sequester carbon amounting to 10-15% of total climate mitigation needs, while at the same time, through the phasing out of various inputs, having favourable effects on ocean acidification. I believe the FAO has a central role to play in making this second green revolution happen.

Tariq Banuri. In my experience, there is broad consensus across many countries about the need for a second green revolution. There is also much awareness about the link between agriculture and climate change, as well as concerning many of the other points raised here today.

There certainly are major issues to be resolved. Under business as usual forecasts, in which current trends in global population and consumption patterns are simply extrapolated into the future, more land and water will be needed for food, and most likely for energy as well. In such scenarios, the only way to feed everyone is to take extreme measures such as clearing the Amazon rainforest for agriculture. Yet we clearly need to protect and even expand our forests. Thus, some kind of major transformation of society and agriculture will be needed, and how to make that transformation happen is the main issue before our commission on the integration of climate and development solutions.

Question. Annika Otterstedt, Environment and Climate Change Team, Sida. **To what extent have developing countries discussed their capacity for absorbing financial flows related to climate mitigation and adaptation? Has the climate issue had any impact on their own interest in incorporating overall sustainability concerns in the policy process?**

Answers. Tariq Banuri. The agenda of sustainable development goes back twenty years. During that time, many developing countries have dedicated serious effort to incorporating sustainability into their development planning. While not perfect, that process has yielded significant results. On the importance of climate change for influencing public policy, I believe that to the extent that the climate issue is exceptional in creating political momentum, this is mostly due to the fact that heads of government are now becoming involved. Earlier sustainability issues tended solely to be the concern of environmental ministries, which usually had limited power over overriding political objectives. As climate change has moved up on the agenda, there are likely much greater opportunities for the sustainability community to influence the direction of development policy.

But while this may have changed, the usual constraints to development have not; and those constraints must not be forgotten, or we will be in danger of seeking solutions to the climate issue which are, in a development setting, not realistic. One reason why I believe that a climate investment plan would be the way to go is because it would be consistent with how development policy currently functions.

Question. Niclas Hällström, SSNC. **There has been some discussion on making action on climate change politically possible. Which parts of the current way of thinking about policy, economics, development and the environment will need to be challenged? For example, what many here seem to view as a need for massive public investment**

contrasts sharply with mainstream economic thinking over the last decades. Which ideas and mindsets are blocking the way forward?

Answers. Munir Akram. First, the prior belief in market systems has been problematic. I think the events of the last six months have shown that markets are not a reliable basis for implementing an agreement which to such an extreme degree is driven by long-term objectives and by the need for political commitments by individual countries. We will have to find different ways of financing. Second, in developing countries, that a certain technology is available does not mean that it is applicable in practice, because there are constraints. There is no mechanism in place for adopting clean technology; sometimes, there is no financing. These are the kinds of shibboleths, if you will, that will need to be addressed and destroyed. What we ought to be negotiating about is a global plan for investment, just as Mr. Banuri has proposed, and a global agreement for sustainable development.

Johan Rockström. In regard to the comments made by Mr. Turesson, ponder that, despite the IPCC this February having admitted to underestimating the climate challenge, their Fourth Assessment Report was indeed used as the basis for policy. Then, even in the least ambitious future, global emissions would have to peak no later than 2015 even for the IPCC mid-scenario not to propel us into dangerous, self-reinforcing climate change.

Remember, at no time in human history have emis-sions risen as quickly as in the ten years since the signing of the Kyoto Protocol. The failure is absolutely blatant. Even for Sweden, which has essentially done the best, there is little to be proud of. The market-based CDM has also blatantly failed; that is the one thing we can be sure of. For that matter, as evidenced by the European Environment Agency and the Stern Review, our very perception of growth has become obsolete. There are some efforts to reform our economic system, including initiatives to include ecosystems and including ecosystem services in GDP; however, they are all incremental, and climate change is incredibly urgent. We are still stuck in the obsolete regime which has stayed with us since the last great crisis; that of the Second World War. As a result, we are in the unfortunate situation of having to consider a sort of double approach. On the one hand, the entire relationship between humanity and nature must change; this will take many generations. On the other, we will be forced to undertake large-scale experiments in societal restructuring. We have to be brave enough to allow ourselves to leave the comfort zone. But remember that there is precedent. We signed the Montreal Protocol in the 1980s for phasing out the ozone-depleting CFCs; and this we did without taxes or cap-and-trade systems. It was a simple prohibition and nothing else, yet on the whole, it worked. Of course, that was easier because our societies depended on CFCs to a lesser extent than on fossil fuels, but it still serves as an example of what is possible. I repeat: we must leave the comfort zone, because even in an IPCC setting, we are now getting it very, very wrong.

Tariq Banuri. As someone who defines himself as a developmental pragmatist, I have always thought that the ideological divide between state and market is not very helpful, in addition to being in my opinion based on a kind of mythology which is notoriously difficult to disentangle from fact. I also feel that we will likely need to utilize all options open to us, including both the public and the private sectors, if we are to be able to achieve our objectives.

Having said this, the exclusive reliance on market mechanisms which became popular in the 1990s has been detrimental to the sustainability agenda. The line between what is the agenda of the state and what is not is constantly being re-evaluated over time because of new experiences and events. The pendulum swung in 1970s, and though in the 1990s it had already become clear that the new order of business was not optimal, it has taken us until 2008 to realize just how misguided that system was, and is.

The pendulum is now beginning to swing back, spurred in part by the realization that the public sector has a unique responsibility to provide guiding investment, to set in place a regulatory framework, and to establish the overall incentives that the private sector needs to assist in fighting climate change. The idea that the state has only to set emissions targets, and that somehow, those targets will by themselves suffice to trigger adoption of green technologies and practices, is fundamentally flawed. The state must shoulder its unique responsibilities.

As a side note, I would like to voice an additional comment on the mythology of market versus state, as well as provide an example. It is often stated, especially in the United States, that market liberalization has been a good thing, as it has resulted in higher growth during the 1980s and 1990s. But the numbers tell a different story.

For the US, if you were to divide the period between the end of the second World War and today into two, equally large segments, both periods exhibit similar growth rates in GDP and labour productivity. Now, in the first half of 1945-75, real wages doubled, stock markets doubled, and there was no major shift in terms of income distribution. In the second half, however, real wages remained flat as all extra income was captured by the upper income segments, and largely by finance.

In the same period, in fact, stock market value multiplied by a factor of twenty, even though GDP only doubled. So in summary, the view that recent decades has seen greater productivity growth because of market liberalization is false: the last thirty years have been no more, and no less, productive than preceding decades.

Christine Loh. I think that the ideas presented so far provide a short summary of what kind of thinking would need to guide the negotiators if the Copenhagen deal is to be successful, knowing what we know today. Even an agreement simply couched in the right kind of language which sparks worldwide discussion on sustainable development would be a major achievement. Perhaps in Copenhagen, starting up that kind of discussion about climate and development will be considered more important that actually deciding what targets to set.

The climate change discussion has captured worldwide public attention in a way that the WTO talks have not managed; issues of equity, development science, of the future of civilisation, issues that are really ingrained into our collective DNA. There are opportunities for the world to take heed, and for us to challenge what has in recent decades been accepted gospel on markets, finance, growth and development. Per-haps the time is now ripe for new insights on what sustainable development really means. Previously, such issues were not really at all considered by agents within the economic mainstream; yet today, even financial analysts and investment banks are slowly starting to take an interest.

Remark. Carl Mossfeldt, Tällberg Foundation. I wish to comment on the political system and the notion of justice. This may actually be the first time in history when the justice argument is superfluous, because we are all, literally, in the same boat. Now, building upon Mr. Rockström's statements on the financial crisis and political will, it seems to me that the people presenting worst case-scenarios for the financial system were equally ignored up until the critical point when the system broke down. Perhaps the lesson is that the political system is essentially reactive to crises; nothing, or not enough, is done until there actually is a breakdown, at which point any and all means are applied in order to solve the crisis.

The problem thus seems to be that environmental collapse is not yet upon us. What this seminar has done very well is to indicate that potential solution to the reactive nature of policy which is embodied in pragmatism. In my view, it is imperative that we manage to rephrase the problem in an effective way so as to avoid needless debate on for example issues of state versus market.

Remark. Bo Ekman, Tällberg Foundation. I think we ought to stay with the bad news. Clearly the situation cannot be resolved by either the political or the economic system alone. What is more, we will most probably have to change the systems themselves in order to arrive at a solution. The situation is characterized by diverging interests at the negotiating table, while at the same time, there is a convergence of multiple crises. These crises all have a global scope and reach, but governments do not, and they represent interests which do not coincide with the interests of the whole.

Would it, perhaps, be more conducive to a strong deal if negotiators were free from their responsibility to represent the interests of individual nations? For that matter, perhaps it would be wise to demand the same of scientists, so as to guarantee that science will be free of the influence of vested interests. In any case, there is a need to transcend current political borders both between and within countries.

As an example, I have recently read Swedish economist Klas Eklund's book on the economics of climate change, which is titled Vårt klimat. Eklund is an outstanding pedagogue obviously possessing great clarity of thought; indeed, this is reflected in the book – until the concluding chapter. There, suddenly, he oscillates toward the mainstream, arguing that there is some "reasonable" middle ground to be found between the sceptics and the urgency of the catastrophic scenarios. That is a very human argument, but it is not the nature of the problem.

We talk about bridging science and politics, but so far we have failed; SSNC, Tällberg Foundation, all of us have failed. Climate change is now so far advanced that we may need to take action on geoengineering within three to five years. Some decision making mechanism will be required for such drastic measures. The Copenhagen deal itself will not be worth more than the systems of sanction that it gives birth to. This really is the time to rethink all of our governance systems.

Question. Emma Lindberg, SSNC. What does today's discussion on the equity or efficiency problems of markets imply for the "double target" approach of the Swedish government and the EU, and for including Clean Development Mechanism offsets in national targets for carbon emissions? As it stands, 50-75% of EU emissions reductions are set to be done abroad as offsets, limiting the scope for domestic action. Beyond that, what is the potential for CDM as a tool for promoting development?

Answers. Johan Schaar. As CDM requires a certain context and a certain level of development, I think we can all agree that it is not going to do the trick.

Munir Akram. It is obvious that not only are such carbon trading concepts not the full solution; they actually delay a true solution. Offsets mandate low emissions in developing countries, while allowing the developed countries which have actually made commitments to delay domestic action. Although funds are transferred and have a temporary impact, the scheme as a whole delays overall progress on mitigation. Consequently, many developing countries, especially the poorer ones, have great doubts about the CDM. Furthermore, if the EU were to a large extent to rely on such mechanisms for meeting their targets, it would be seen by many developing countries as trying to shirk responsibility.

Christine Loh. China has benefited greatly from CDM projects. Still, as Ambassador Akram has said, it is clear what its shortcomings are. Broadly speaking, the point of the CDM is the transfer of investment from developed to developing countries, and that kind of mechanism could arguably be incorporated into the kind of investment plan proposed by Mr. Banuri. But if we are serious about building a sustainable future, and about transferring much greater financial flows than is the case today, then that post-CDM mechanism would need to be redesigned from the bottom up.

Tariq Banuri. Emissions will have to be reduced to such an extent that massive investment will be needed in both developed and developing countries. Therefore, it is a major mistake to consider financial mechanisms under the assumption that there is a choice between where reductions ought to take place, because we will need to reduce carbon emissions everywhere. In that context, rich countries will need to adopt double targets, meaning one target for domestic cuts, and one for mitigation financing abroad. As we heard, in the analysis of the SEI, Sweden will need to reduce its emissions by more than 100% by 2020. That means that some reductions will have to take place elsewhere, and in that context, there is a part to play for a mechanism that may or may not resemble the CDM.

Concluding remarks

Johan Schaar

Climate change will not only affect the poor most strongly, but it will actually drive them even more deeply into poverty, marginalizing already marginalized people. The livelihoods and interests of these people must be taken into account in the climate agreement. For example, REDD and schemes for using soils as a carbon sink may result in further displacement of people with no formalized land rights.

Tariq Banuri

Let us not lose sight of what is our real objective. Instead of debating what money goes where, who pays and who receives, what we ought to be focusing on is, after all, reducing emissions. You might compare the situation to two restaurants. In one of them, there is a lot of bustle, noise, waiters running around, and so on; but there is no food on the plates. In the other, it is very quiet and there is little movement; but everyone is eating.

The second restaurant is where we need to go, but I fear that the first one is more representative of where we are today. Currently, there is discussion and debate on several points; but will those discussions actually result in the reductions we need? Keep in mind that all it takes is a simple mechanism that brings emissions down, and a plan which rewards countries for actually producing results; for actually putting food on the table. I believe that there are ways to construct such simple mechanisms for investment; such as a kind of global feed-in tariff, where developed countries partially subsidise climate-friendly investment by supplying to producers and entrepreneurs only the excess cost associated with adopting green technologies instead of conventional ones. It is a simple idea, relatively easy to implement, and most importantly, it would yield results.

One final point. A curious divergence between parallell processes is hindering progress on this issue. First, there is the scientific process, which has been continually revising its estimate of what atmospheric greenhouse gas concentrations are considered safe as new findings have emerged. Fifteen years ago, we were still viewing doubled concentrations, 550 ppm, as a reasonable target. By the third Assessment Report, we were considering 450 ppm as a maximum safe concentration. Today, Jim Hansen of NASA, having previously indicated 350 ppm, has revised his estimate even further downwards, to 300-325 ppm. Such a target implies that from 2050 on, we would need to bring net carbon out of the atmosphere.

Second, there is the unfortunately very slow political process which as we have heard, even after taking the evolution of those figures into account, is considering a 50% target until 2050. With such a target, we would have only approximately a 25% chance of even peaking at 450 ppm. Third, there is the financial process; even if such a weak target was agreed upon by the political process, the financial institutions and ministries would protest, and complain that the funds needed to reach it are "impossible" to mobilise. These processes are clearly mismatched and will need to be brought together in a much more effective fashion in the future.

Johan Rockström

Much of what has been discussed here today concerns bridging the gap between what is necessary to do, and what is considered possible to do. The necessary challenges are tremendous, expressed not only by the scientific findings, but also by Ambassador Akram's reflections on the development challenge. On a related note, I would like to thank Ambassador Akram for his struggle at the Bali summit to include developed country financing as a mandatory component, as his efforts to include measurable, verifiable and reportable investment commitments helped to save the Bali process.

In the end, however, a low carbon economy is not a choice; and once developed countries really begin making an effort into reducing reliance on fossil fuels, the rest of the world will follow suit, because by then, the fossil economy will have become obsolete.

While discussing the possibilities and difficulties of mitigation, we must also not forget the immense investments

needed – starting immediately – on adaptive capacity. In making that happen, I think that Sida has a central role to play.

Lastly, this collaboration between the SEI and the SSNC is a reflection of the fact that the SEI, being an independent, international research organisation, is finding it increasingly frustrating to be left out of the policy process. The situation is so severe that we need to ally with civil society organisations in order to work for change.

We are also working closely with the Tällberg Foundation, having presented the "Grasping the climate crisis" booklet at the Poznan summit. That text may well have influenced policy makers significantly, with Commissioner Stavros Dimas actually pointing to 350 ppm as a necessity in a global climate agreement. There is potential for an interesting coalition to be forged between science and development NGOs around the world for tackling this crisis. With that, as co-organiser of this seminar, I would like to conclude with thanking all of you for coming; and now, our work continues.

Presentation of speakers

Munir Akram

Munir Akram was the Pakistan Ambassador to the United Nations between 1995 and 2008 and has twice served as President of the UN Security Council. In recent years, he has increasingly focused on issues of climate and development, for instance as head of developing country (G77/China) negotiators at the 2007 Bali Ministerial Meeting. Akram played a pivotal part in the final negotiations leading up to the "Bali Action Plan", which forms the basis for negotiations towards the Copenhagen summit.

Christine Loh

Christine Loh is based in Hong Kong and founder and Director of the organization Civic Exchange,. She has an extensive background in the private sector and as policy advisor. She is now, among other things, international adviser to the G8+5 Climate Change Dialogue, Board Member of the Tällberg Foundation, as well as Director of the Hong Kong Stock Exchange.

Johan Rockström

Johan Rockström is Director of Stockholm Environment Institute (SEI) and of Stockholm Resilience Center (SRC). Under his administration, SEI has brought several important elements into the climate negotiations. SEI has shown that recent science necessitates setting more ambitious objectives. In addition, it has developed an influential model – the Greenhouse Development Rights (GDR) – for assigning responsibility for effort sharing on climate change action while accommodating the right to development of poor people.

Tariq Banuri

Tariq Banuri is Director of the UN Division for Sustainable Development and former Senior Fellow and director of the Future Sustainability Program of the SEI, subsequent to heading the SEI Asia Centre. Banuri has broad experience of working on the boundary between policy and science with a particular focus on sustainable development and the integration of climate and development. He has made important contributions to the IPCC process, having coordinated the Third Assessment Report chapter on sustainable development as well as having co-written the Second Assessment Report chapter on equity and social considerations.

Anders Turesson

Anders Turesson is Chief Negotiator of the Swedish Ministry of Environment and Swedish Head of Delegation at the international climate negotiations under the UN Framework Convention on Climate Change.

Johan Schaar

Johan Schaar is Director of the Secretariat of the Commission on Climate Change and Development, which was instituted by Swedish Minister for Development Assistance Gunilla Carlsson and which will publish its final report in May 2009. He previously worked with coordination of the Red Cross and Red Crescent efforts after the Indian Ocean tsunami, and has also served as director of the Sida Division for Humanitarian Assistance.

Svante Axelsson

Svante Axelsson has been Director of the SSNC since 2000, having previously worked at the SSNC as environmental economist and as head of the Environment Department. Svante Axelsson developed environmental economics as a subject at the Swedish University of Agricultural Sciences, 1988-1993. His work at the SSNC covers a broad range of environmental issues, but focuses on climate change in particular.

Moderator Niclas Hällström

Niclas Hällström works as expert on climate at the SSNC International Department, focusing on policy issues connected to climate and development. Before joining SSNC in 2008 he worked with the Dag Hammarskjöld Foundation for many years, and, before that, was part of creating the Centre for Environment and Development Studies (Cemus) in Uppsala, where he still teaches. He is presently setting up an independent initiative – "What Next?" – in parallel to the work on climate.

Seminar report from Seminar no. 2:
Footing the bill for climate change

– How do we generate the money?

Large investments will be required in order to achieve a global shift to new energy sources, as well as for adaptation measures that are vital, particularly for the people and countries which are the poorest and most vulnerable. Financing of climate change mitigation and adaptation will likely be a key issue in the coming UNFCCC negotiations leading up to the Copenhagen meeting in December 2009. How do we generate the needed resources? This second seminar in the seminar series 'Key issues for climate change and Copenhagen 2009' discussed these challenging issues and also constituted the launch of a new report on Climate and Financing.

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues2

Participants: Svante Axelsson, Executive Director of the SSNC, Göran Eklöf, Context, author of the report ”Klimatnotan”, Meena Raman, Third World Network, Klas Eklund, Senior Economist, SEB, Lars Lundberg, the Swedish Prime Minister’s Office.
Moderator and project coordinator: Niclas Hällström, SSNC The seminar took place: 19 March 2009, Kulturhuset, Stockholm

www.naturskyddsforeningen.se

Footing the bill for climate change:

– How do we generate the money?

Svante Axelsson

Introduction on climate financing

Large amounts of money are required for both mitigation and adaption to climate change, making the financing of such action a key issue which must be resolved in order for a sufficiently strong climate deal to be achieved. With less than a year until the Copenhagen summit, the environmental movement, as well as many developing countries, is expecting the EU to take the lead. Even the head of the climate negotiation secretariat of the UN, Yvo de Boer, recently said that "It's clear that we need significant financial support for poor countries on the table. I think it is essential that the EU comes up with an amount at the spring council." That council concluded on 20 March. And yet, neither Sweden nor the EU have publicly stated any form of concrete financial commitments.

How much money will it take? Calculations made by the UN Framework Convention on Climate Change (UNFCCC) estimate that by 2030, costs for mitigation will amount to 200-210 billion USD per year. Adaptative needs in developing countries have been assessed at 9-86 billion USD per year, although in practice, figures on adaptation are actually more likely to run in the hundreds of billions. Certainly, these are large sums, though they should be put into perspective. First, they are far outweighed by the tremendous amounts currently being spent on lessening the impact of the economic crisis. Second, the costs of inaction are even higher.

There are several possible ways of generating the necessary financial resources. Perhaps the most interesting would be to levy a global tax on aviation and shipping. Apart from generating revenues which can then be rechanneled into adaptation and mitigation projects in developing countries such a scheme would also directly tackle the problem of CO_2 emissions – a double dividend. Other options include a global but differentiated tax based on national income levels; the proposal for auctioning of a set number of emission permits; or the already existing fee on the Clean Development Mechanism (CDM). These are all examples of public financial flows; however, a great deal of private investment will also be required.

With such a multitude of financial mechanisms, a few criteria for assessing their relative strengths might be helpful. Some suggested criteria are:

- Existence of positive side effects, such as direct environmental benefits
- Equity
- Effects on the building of trust between the north and the south
- Stability and predictability
- Being based on the UNFCCC and on clear principles such as "common but differentiated responsibility"
- Potential for upscaling and adjustments over time
- Benefits for domestic employment and business

The CDM system, which in any case must be reformed, can only form a minor part of any framework for financing. A more interesting idea, which also would combine public and private investment, would be the introduction of global feed-in tariff systems for renewable energy, establishing a high energy price for producers of renewables while preserving low consumer prices.

The position of the SSNC is that Swedish climate policy must balance, as it were, on three equally important pillars: domestic mitigation efforts, mitigation in developing countries, and adaptation in developing countries. It is crucial when considering financing of mitigation in developing countries, to focus funds on "hard" and more expensive projects that facilitate technical shifts, and not on the cheapest projects that might have been carried out anyway. For 2020, we believe that 40 % of carbon emissions should be reduced domestically, and at least 40 % abroad. The Swedish government pushes for only 27 % domestically and 13 % abroad: thus, our action plan is twice as ambitious as that of the government.

"So far, the actual contribution from developed countries to climate action in developing countries has been utterly inadequate."
Göran Eklöf

Göran Eklöf
Presentation and summary of the report *Klimatnotan. De rikas ansvar och de fattigas rätt till utveckling*

The report, of which an English translation is forthcoming ("Footing the Bill: The responsibility of the rich and the right to development by the poor"), is the result of collaboration between the SSNC, Forum Syd, The Swedish Cooperative Centre and Diakonia. It has a strict focus on public, official financing schemes; thus, with the exception of the CDM, private investment flows are not considered.

First, a note on costs. The report includes calculations of the amounts needed for both climate change mitigation and adaptation. It is likely that the cost figures referenced by Svante Axelsson are grossly underestimated. For example, a single proposed project for climate adaptation in the United Kingdom – strengthening the Thames barrier against floods – has been estimated to cost 8 billion, as compared to the estimated total developing country adaptation costs of 9-86 billion per year.

Developed countries have, under the UNFCCC, already made considerable commitments to help developing countries meet such costs. According to the Convention, developed countries shall provide "adequate and predictable" assistance through "new and additional financial resources"; that is, climate financing should not be drawn from the existing aid budgets. The UNFCCC also states that the "implementation of commitments by developing countries depend on financing and technology transfer from developed countries, and take fully into account development and poverty eradication as overriding priorities".

However, so far the actual contribution from developed countries to climate action in developing countries has been utterly inadequate, as little more than one tenth of a percent of estimated needs has been supplied. Moreover, developed countries, obviously not having delivered on their responsibilities, are now nevertheless pushing for mitigation and adaptation commitments by developing countries.

Although developed country contribution has, as yet, been miniscule, the financing infrastructure is, to a large extent, already in place: a number of eligible channels exist for financing climate projects in developing countries. There are, for example, the various funds of the UNFCCC Global Environment Facility (GEF), as well as the so-called Adaptation Fund which was agreed upon at the Poznan summit and will become operational this year. There is also the much-debated Clean Development Mechanism (CDM) of the Kyoto Protocol. CDM, which is a mechanism for mitigation in developing countries, is in many ways a flawed instrument. There are problems with, for example, additionality, in essence meaning that many of the emission reductions funded by the CDM would have been achieved even without that support; the fact that the CDM is very fragmented, with projects being carried out with no consideration to overarching objectives and long-term national plans; and the apparent failure of many projects to give due consideration to sustainable development.

In addition to the initiatives already mentioned, there has been a recent proliferation of financing channels not administered by the UNFCCC. Many of these are official funds instituted by various developed countries, although the World Bank has also initiated a number of funds, such as the Climate Investment Funds and the Forest Carbon Partnership Fund (FCPF). Judging from recent commitments of financial resources, it is clear that developed countries prefer to use such channels for financing, rather than the funds of the Convention. The fragmentation of financing, however, represents a real danger in terms of coherence and transparency.

In light of the host of new proposals on mechanisms for financing that have been generated during the course of the negotiations, there has been some debate on what principles should guide initiatives on financing. Many of the suggested principles are also included in the UNFCCC framework. Within civil society, there is a growing consensus that funds for climate projects must be

- New and additional
- Predictable
- Appropriate: grants, not loans
- Equitable
- Adequate
- Strategic: for example, compatibility with development goals

Apart from the issue of how financial resources should be channelled, there is the essential problem of raising them. Concrete proposals on mechanisms for financing include auctioning of carbon permits, as advocated by Norway and already implemented (though much criticized) in the EU; extension of the CDM system; a global carbon tax; and the establishment of a global climate fund administered by the UNFCCC to which developed countries, in addition to aid budgets, would be obliged to contribute between 0,5 and 1 percent of GDP. The global fund proposal was put forward in June 2008 by China and the G77 (a coalition of 130 developing countries), though developed countries have so far, to much frustration, chosen not to comment on it.

What, then, is the stance of the Swedish government? Swedish contributions to mitigation and adaptation in developing countries have generally been drawn directly from the aid budget. However, the provision of "new and additional" in the Convention implies that this is not in accordance with current obligations, because in essence, climate financing should be seen as paying damages, not as developmental "charity".

In addition, one might observe that few developed countries have ever come close to delivering even on their aid commitments. So the first step ought to be to double the aid budgets in order to live up to that obligation – and then, as a second step, to at least double that amount for climate change purposes.

Meena Raman
Perspectives from the South: G77/China's proposal for a new global fund and civil society views

This report certainly makes my job a lot easier and may function as the basis for much work that is yet to be done. For me, Copenhagen is not the "now or never" moment that it has often been described as. Rather, it is one milestone of a long struggle to meet both the climate challenge and the development challenge.

There are huge differences in perspective between developed and developing countries on what meeting the development challenge actually means. In developing countries, it means addressing basic needs: housing, education, health, sanitation, and so on. In rich countries, the perspective is different. For example, while the developed world might focus on whether to run cars on petrol or biofuels, the developing world needs energy for cooking and other basic needs. And what the climate crisis does is to exacerbate that development challenge even further.

The climate crisis is a result of developed countries having built their prosperity and their entire way of life on emissions of carbon dioxide, though the poor and vulnerable countries, who were not responsible for climate change, are having to pay the price. Consequently, climate financing is not about charity, but about addressing payment of damages and about the need for developing countries not to follow the same growth pathway as did rich countries.

When the UNFCCC was ratified by the developed countries at the Rio Summit in 1992, it was clearly stated, through the key phrase of "common but differentiated responsibility", that responsibility for dealing with climate change rests with developed countries. The Climate Convention is an international treaty, and therefore they have a legal obligation to enable adaptation and mitigation worldwide through financing and technology transfer.

Yet since the Rio summit, there has been little progress. The Clean Development Mechanism instituted under the Kyoto Protocol is not about climate financing, but rather it is a way in which developing countries can avoid taking do-

"CDM is a simple way out, a flexibility mechanism for developed countries, and clearly not a way forward."

Meena Raman

mestic action. The emission reductions made through CDM, if any, are counted for the donor country, not the country where the reduction is taking place. In fact, the position adopted by the EU on so-called effort sharing means that domestic mitigation may be limited to as little as one third of the total 20 % carbon reduction to which the EU has committed. CDM is a simple way out, a flexibility mechanism for developed countries, and clearly not a way forward.

Now, because developed countries have not done their part, the future looks bleak. Even the IPPC conclusion that a emission reduction goal of 25-40 % by 2020 is needed to keep below two degrees, supported by the EU at its lower end, will not be enough. According to the latest science, the earth may already be committed to a 2.4 degree temperature rise, regardless of what emissions pathway we choose for the future. The atmosphere is so polluted that even the space for further development of developing countries is constrained.

That fact has recently been used as a reason for developed countries to shirk their responsibility: somehow, developing countries are now expected to share their responsibilities. The point of the Bali Action Plan which came out of the 2007 summit was not for the developed countries to really take any new action, but for them to implement commitments already made. But those same countries are now pushing to change key aspects of the Climate Convention. There is mounting pressure to change the crucial wording of "common but differentiated" to "common and shared", and developing countries are now expected to formulate plans for a low carbon economy – simply because developed countries have not done their job properly.

As developed countries reject their responsibility for climate change, there is now also a shift in focus from financing by grants to financing by loans. The World Bank, as has already been seen many times, is not a climate-friendly institution, and it is clearly biased in favour of the donors. In order to support fair and equitable financing, we need a new financial agenda.

The proposal put forward by China and G77 basically represents an outline of what has to be done on climate financing. It would enable us to ensure that financing is still carried out within the framework of the Convention, and it is a transparent platform, where all stakeholders, including civil society, will be able to participate. Developed countries, however, have not seen fit to even comment the existence of this proposal.

Instead, the European Commission has put forward a plan of its own. That proposal relies heavily on CDM-type offsets – counting emission reductions in developing countries towards developed country targets – rather than the kind of true financing which is obligated by the UNFCCC. According to the proposal, the EU will only truly finance projects that are not counted as offsets, and which developing countries cannot fund themselves. This amounts to fundamentally changing and undermining the spirit of the Convention. If that spirit is not maintained in Copenhagen and beyond, we are, simply put, heading for disaster.

Klas Eklund
Perspectives from a senior economist

As a bank economist with little experience of foreign aid issues, I feel somewhat out of place in this setting. However, I gained many insights from Göran's report and have great sympathy for its central thesis that climate policy and development policy should be coordinated. In order to forge a truly global deal in Copenhagen, the next climate agreement cannot simply build upon the Kyoto Protocol; the scope and scale has to be widened, and technology transfer as well as aid must be included.

Although official financial flows are important as a political stepping stone for building consensus on such a deal, the debate on financing must be put into perspective, in several senses. First, the big picture is that compared to private financial flows or even aid commitments, the amounts involved in the negotiations on official climate financing are actually very small. The real question is how to trigger and

"Compared to private financial flows or even aid commitments, the amounts involved in the negotiations on official climate financing are actually very small".

Klas Eklund

redirect the enormous flows of private capital around the world.

Second, in order to significantly reduce emissions, the developed countries need to start on a transition towards a low carbon society. According to the International Energy Agency (IEA), such an energy revolution could be accomplished by radically improving energy efficiency, while at the same time rolling out renewable energy sources on a massive scale. This must be done, but it will not be easy or cheap, because there is no one "silver bullet" to solve the energy crisis. According to the IEA, the transformation of the energy sector alone will cost 50 000 billion USD over the next few decades. So in the big picture, flows to developing countries are miniscule by comparison.

To an economist the optimal thing to do, assuming an objective to stabilize atmospheric greenhouse gas concentrations at 400-450 ppm, would be to establish a global price of carbon at 40 €/ton or more: four times the present price of emissions in the European Emissions Trading System (ETS). Such a uniform price would be the key to triggering private investment; unfortunately, however, it is highly unlikely that such a move would be politically possible.

The second-best option would be widening the scope of current cap-and-trade systems, such as the European Emissions Trading System (ETS), into a system encompassing at least all OECD countries. It is true, the ETS has problems and has not yet worked according to plan: the cap on emission permits was set too high, resulting in a low price, limiting the incentive for producers to adopt renewable technologies. Also, too few sectors were included in the scheme. However, the ETS is being reformed and some issues are being resolved; and a lower cap, implying a higher price of carbon, could go a long way towards transforming our economies.

The CDM system also has its flaws. Most importantly, there is no cap, meaning that while CDM projects may lower emissions in developing countries, in the wider sense there is nothing to stop those countries from increasing their overall emissions. There are also problems with additionality, fragmentation, bureaucracy, and corruption. Some of these issues may be resolved, others may not; still, CDM is an important way of using trade of emissions rights to create a flow of funds to poor countries.

Thus, although official flows are important for political reasons, we cannot afford to forget that most of the work on climate change is going to be done by the private sector. A multitude of private investment projects, administered by the World Bank and others, are only just starting up, and given the right incentives, they could be only the beginning.

Lars Lundberg
Climate and financing on the road to Copenhagen: How will EU and Sweden act?

Financing is obviously a central and crucial issue, as well as a difficult one. First, it concerns the raising, allocation and distribution of money, which always makes for sensitive negotiations. Second, given the multitude of commitments and the proliferation of financial mechanisms, the issue is very complex. Third, as has already been demonstrated, there is a lot of uncertainty regarding the need of funds for adaptation and mitigation. Fourth, these negotiations go back to the early 1990's, and many positions are quite entrenched. It is very much a North-South issue, with a great deal of moral content.

The EU has come a long way, but much remains to do. The climate and energy package was a major accomplishment and provides the EU with a solid base for taking on continued leadership in the climate negotiations. On finance though, the discussion has just started, and the debate has been intense. Although Sweden will take on the presidency, the EU has a collective commitment under the Kyoto Protocol and remains a collective bargaining party. Thus, the main task for the Swedish government will be to reconcile the views of all 27 member states.

Already, a number of things have been agreed upon by

"Action on climate change will cost a great deal of money, and we can only afford it if policies are as cost-effective as possible. "

Lars Lundberg

the European Council. For example, it was stated that "substantial support on an appropriate scale from both private and public sources will be required." On adaptation, the EU "is prepared to take on its fair share." There is also broad agreement that the emissions trading market should play an important role, as should the CDM; although that scheme needs reform and improvement in light of its apparent lack of environmental integrity. Linking the ETS with emerging carbon trading systems in other industrialised countries is a priority. By 2020, it is hoped that it will be possible to integrate such a large-scale carbon market with similar schemes in advanced developing countries.

Remember, only effective mitigation can save the planet. Action on climate change will cost a great deal of money, and we can only afford it if policies are as cost-effective as possible. This is the part that offsets through flexibility mechanisms such as the CDM need to play, because mitigation is generally cheaper in the developing world. There is still the question, though, whether such efforts should be domestically financed, used as offsets or genuinely funded by the industrialised countries? Within the EU, it has been agreed that at least for advanced developing countries, the existence of a so-called Low Carbon Development Strategy should form the basis for assessing the need for direct support from the developed countries.

These are all areas where consensus has been achieved. In contrast, there is no agreement regarding the possibility of earmarking public revenues. Earmarking is seen by some as unjustly imposing a tax on sovereign countries, while in the broader sense, it really is an unsound practice; use of funds ought as a rule to be decided on the basis of assessing the relative costs and benefits of available uses or policies, not by earmarking. On the other hand, it is sometimes argued that in this extraordinary situation earmarking may be required in order to create a reliable and adequate flow of funds.

In addition, there have been no concrete figures on financial commitments as of yet. Then again, there also has been no word from the new US administration; and after all, the discussion on finance within the EU has only just begun. There are some major venues for negotiations on these and other issues prior to the Copenhagen summit, notably at the G8 meeting in Italy in July and the United Nations General Assembly in September.

Discussion and questions from the audience

Question. Gunnel Axelsson-Nycander, Svenska Kyrkan. **Has the Ministry of Finance been correct in its strong resistance to the earmarking of revenues for climate financing?**

Answers. Klas Eklund. Practically no Ministry of Finance, anywhere in the world, is fond of earmarking, because it reduces flexibility and capacity for decision making. From a climate perspective, that sort of attitude may well be unwise, but from their perspective, retaining financial sovereignty is a top priority.

Svante Axelsson. Earmarking is essential to creating a reliable framework, and must be viewed pragmatically as a way of solving the problems facing us. Sweden really ought to reconsider its positions on this issue.

Lars Lundblad. As for whether the Swedish stance on earmarking will shift, you will simply have to wait and see what comes out of the negotiations.

Question. Christina Engfeldt, FAO Sweden. **The EU has promised it would lead on climate change. Instead, there has been internal bickering over even small sums. By now, the entire negotiation process is in peril as developing countries are increasingly asking for comments, for anything, on commitments, concrete figures, or the G77 proposal. What is going on?**

Answers. Svante Axelsson. Although there are internal problems and differing interests within the EU, this might actually be a tactical decision, since the US has yet to unveil their own stance. If so, however, I believe that the EU is pursuing the wrong tactic and doing more harm than good.

Klas Eklund. It's fair to say, at least, that the EU was in the lead, and in many respects, it still is. So far, there has been more talk than action from the Obama Administration, the exception being a great deal of funds spent on research and development. Crucially, nothing has been decided on an American counterpart to the ETS.

Lars Lundberg. I am somewhat surprised to hear of diminishing confidence in EU leadership. After all, these things take time; a consensus must be forged among all 27 member states. Remember, the ETS only started functioning in 2008, and not even two months have passed since the European Commission communication on financing was put forward. Also, it would simply not be wise for the EU to set in stone any own positions at this stage. There are negotiations still to come, and a great deal of flexibility will no doubt be called for.

Meena Raman. In all fairness the EU has for some time been seen, especially within civil society, as an environmental champion. After all, they were the only ones who had concrete targets on the table. Now, however, we have been very disappointed to learn that most of the EU 20 percent target is actually offsets – not domestic cuts. Even environmental groups that initially supported the EU have now begun to withdraw or reconsider that support.

Not putting all your cards on the table in sensitive negotiations is one thing. Another is to consistently adopt a maximalist position, only declaring what you are at most willing to commit to, instead of what you are at least willing to do. It has really come down to questioning to the underlying principles and the spirit of the EU stance on climate. This is not about the numbers of the emission cuts, but about the EU attempting to subvert the principles of the Convention, apparently backtracking on the climate issue due to the economic crisis, and showing signs of fundamental reluctance to living up to their commitments. The question for the EU to ask should be: "How can we help the G77 and China?"

Question. Per Bolund, Member of Parliament (mp). **There has been much discussion about the magnitude of the**

sums to be contributed and much less on the actual channels and mechanisms. What are the relative merits of these? Should we rely on a UN-administered fund, as the G77 proposal suggests, or on the World Bank? Also, the World Bank financing is often by loans, not by aid or grants. Is it fair for financing of climate action to take the form of loans?

Answers. Klas Eklund. In my opinion, both grants and loans are needed. The World Bank may have a tarnished reputation in some respects, but it is considered a safe investment in these times of financial turbulence, and I believe that it is genuinely serious about cleaning up the environment. It has a number of projects, for example the so-called Green Bond which I have helped to develop, aimed at achieving this goal. Still, there is always room for improvements, in this case of governance structures in order to strengthen democratic participation.

Göran Eklöf. Donor governments clearly have a very strong preference for basing financing on institutions such as the World Bank, but as for governance changes, it is important to remember that these kinds of reforms have been discussed for fifteen years without any actual changes taking place. In addition, while the World Bank may have a number of climate-friendly intiatives, the overwhelming majority of their funding is still directed towards fossil energy.

Meena Raman. Within the UN system there is a great deal of financing experience in the fund instituted under the Montreal Protocol, the treaty on phasing out CFCs and protecting the ozone layer. That fund forms a precedent which is superior to the World Bank in that it is more transparent, more equitable, and more suitable for the dissemination of knowledge. Why not a similar fund, instituted under the UNFCCC, financing through grants instead of loans?

Question. Niklas Hällström. **The G77 proposal suggested that developed countries should contribute between one half and one percent of annual GDP. What are your thoughts on how that amount relates to the massive investments needed to drive the transition to a fossil free society, and how the fund could help trigger or direct those investments? Have the developing countries been too modest, even?**

Answer. Göran Eklöf. Official financing will not cover a great share of needed investment flows. However, if properly managed they potentially have a great strategic value in that they can be politically directed and coordinated with national development plans. The existence of a climate fund may also help to create platforms for and guide the direction of the private flows.

Question. Svante Axelsson. **Klas mentioned a global carbon tax as the best way to spur the transition to a low carbon society. Even disregarding the political challenges associated with instituting such a tax, would it really be a feasible and attractive way forward, given the unequal distribution of income across the planet?**

Answers. Klas Eklund. What is optimal from a purely economic perspective – in this case, placing a global price on emissions – might in practice not be desirable because of equity. As an economist I represent the economic efficiency side of the argument, while on the other hand much – though not all – of the environmental movement is motivated by moral and equity concerns. In the real world, the economic and the moral view will have to meet on some middle ground.

Meena Raman. Because effects of mitigation may well be differentiated between developing and developed countries, it is important to separately consider impacts in developing countries. If certain mitigation policies lead to the vulnerability of poor countries being increased, they should not be

regarded as solutions. Consider, for example, the effects of a global aviation and shipping tax on the tourist revenues in developing countries. One size does not fit all.

Question. Anders Friström, Sveriges Natur Magazine. **The OECD countries prefer CDM-style projects, while the G77 advocate a global, UN-administered fund. As a result, on the Poznan summit in December 2008 there was an obvious and almost complete deadlock on the finance issue. How can the differences of opinion be reconciled ahead of or at Copenhagen?**

Answer. Göran Eklöf. The real reason for the deadlock, I think, is that financing is being viewed as a moral issue, where really it is not. It is a legal issue. The developed countries have legal obligations under an international convention, but are now placing conditions on fulfilling those obligations by requiring that developing countries take action as well. The industrialised countries have not shown any clear intention of meeting their commitments, as indeed they have not done so in the seventeen years following the signing of the UNFCCC.

Question. Emma Lindberg, SSNC. **Given the enormous amounts of money being spent on alleviating the economic crisis, it might seem only logical to spend comparable sums on the environmental crisis. Why is this not being done, and why is generally – not least in Sweden – only a small part of the financial stimulus packages being announced dedicated towards "green" projects and jobs?**

Answer. Klas Eklund. From an environmental standpoint, a recession could be good or bad, depending on the circumstances. The downturn may divert interests and money, as well as causing the price of oil to fall and thereby delaying the shift to renewable energy. I agree that not enough is being done in terms of "green" stimulus packages, especially since what is done now will set the stage for the next upswing. More than anything, the recession ought to be seen as an opportunity to build that new economy which is needed.

Discussion and questions from the audience

Göran Eklöf

Göran Eklöf is a biologist and author with many years of experience of working on environmental issues from a development perspective. His previous work includes a review of the market mechanisms under the UN Framework Convention on Climate Change, and studies of how environmental issues are handled by international financial institutions, the WTO, and in the context of export promotion. Recently he has been assisting the OECD in working with civil society for more efficient development aid.

Meena Raman

Meena Raman is a lawyer from Malaysia, where she has worked for over 20 years with consumer, environmental and development issues. Now working at the Third World Network (TWN) in Geneva, her primary area of focus is climate change. TWN operates in close collaboration with governments as well as civil society organizations in the South, and has as adviser to the G77 been instrumental in helping to design concrete proposals on mechanisms for climate financing. Meena recently resigned as Chair of Friends of the Earth International, although she retains her seat in the Executive Committee.

Klas Eklund

Klas Eklund is Senior Economist of SEB, one of the largest Swedish banks, where previously he worked as Chief Economist. He is also a member of the European Commission's Group of Economic Policy Analysis led by the President of the Commission. In the 1970s Klas Eklund worked as lecturer and researcher at the Stockholm School of Economics, and in 1984-87 as Economic Policy Adviser to the Swedish Prime Minister. In the late 1980s he worked as head of the Department of Economic Analysis and Forecasting at the Ministry of Finance, in addition to being a member on the Swedish Central Bank Board of Governors. Klas Eklund is also a prolific writer and lecturer and has authored a bestselling economics textbook, *Vår ekonomi* ("Our Economy") and recently published a new book on climate change Vårt klimat.

Lars Lundberg

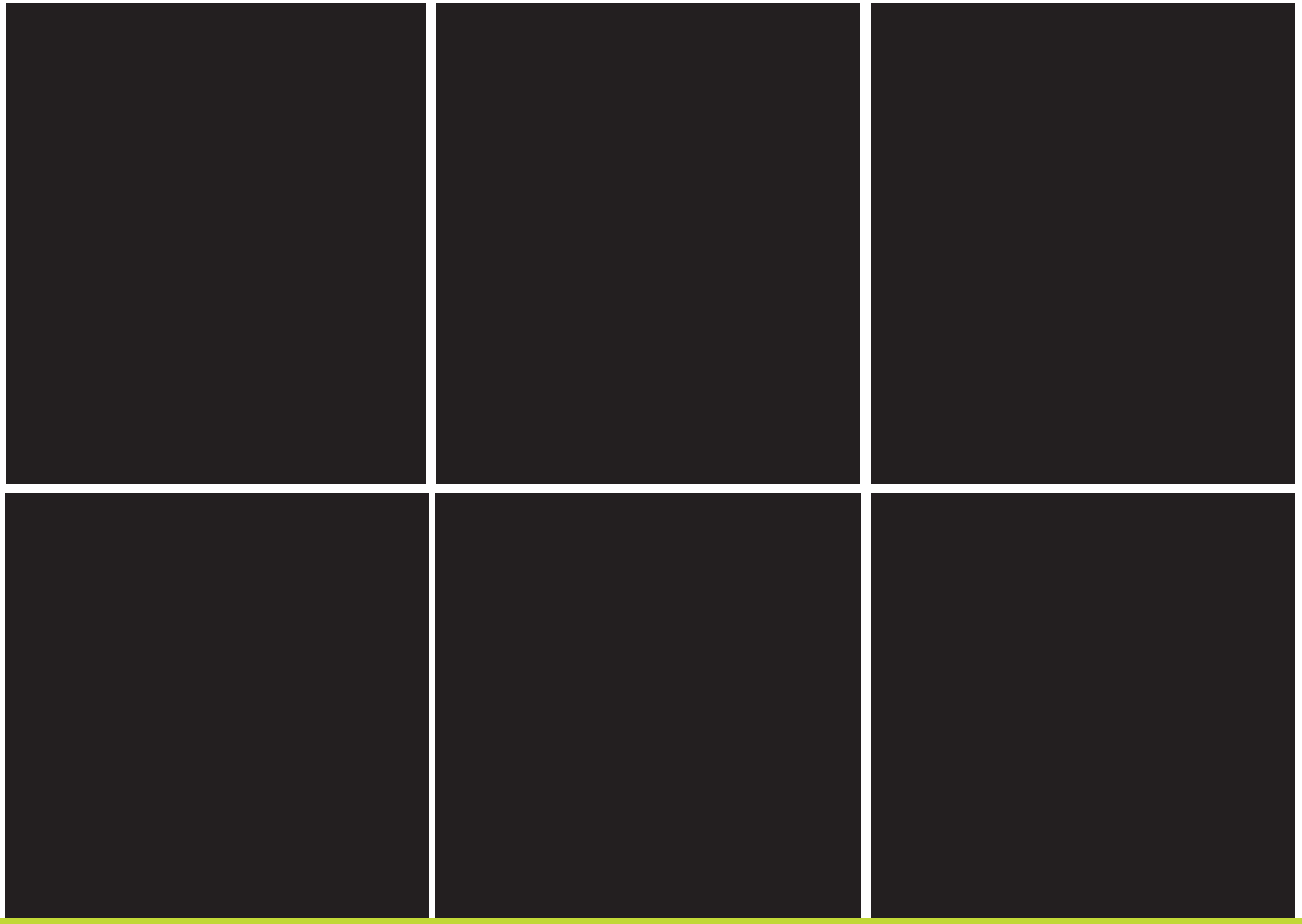
Lars Lundberg works at the Climate Policy Secretariat at the Swedish Prime Minister's Office. The Secretariat is assigned with assisting the prime minster on climate policy, in particular in relation to the Swedish EU Presidency. Previously, Lars has done work on climate policy, sustainable development and European affairs at the Ministry of Finance and in Brussels.

Svante Axelsson

Svante Axelsson has been Director of the SSNC since 2000, having previously worked at the SSNC as environmental economist and as head of the Environmental Department. Svante Axelsson developed environmental economics as a subject at the Swedish University of Agricultural Sciences, 1988-1993. His work at the SSNC covers a broad range of environmental issues, but focuses on climate change in particular.

Moderator Niclas Hällström

Niclas Hällström works as expert on climate at the SSNC International Department, focusing on policy issues connected to climate and development. Before joining SSNC in 2008 he worked with the Dag Hammarskjöld Foundation for many years, and, before that, was part of creating the Centre for Environment and Development Studies (Cemus) in Uppsala, where he still teaches. He is presently setting up an independent initiative – "What Next?" – in parallel to the work on climate.



Seminar report from Seminar no. 3:
The world's forests

– More than carbon sinks

The issue of tropical forests and climate is already becoming one of the hottest issues on the path to Copenhagen; and controversies will most likely keep intensifying. What part do forests play in protecting the climate, and what is the best way to protect them? How can biological diversity be supported, tropical forests conserved, and the rights of local communities safeguarded?

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues3

Participants: Svante Axelsson, Executive Director, SSNC, Erik Eriksson, Swedish Energy Agency, Swedish negotiator on forest-related climate issues, Anders Lindroth, professor of Physical Geography, Lund University, Meena Raman, Third World Network, Rukka Sombolinggi, AIPP
Moderator and project coordinator: Niclas Hällström, SSNC Summary by: Claes Ek The seminar took place: 14 May 2009, Kulturhuset, Stockholm
Tryck: Stockholm juli 2009

www.naturskyddsforeningen.se

The world's forests

– More than carbon sinks

Svante Axelsson, SSNC
Introduction

Welcome to the third seminar on climate change, initiated by the SSNC as a forum for discussion and dialogue on the complicated key issues before us all. Such dialogue is essential, not the least in view of the Copenhagen climate change summit in December this year. The seminars are part of an open policy process on behalf of the SSNC; recognizing that we do not have all the answers, we consider it important to listen to fresh perspectives and ideas before deciding on specific positions.

As we all know, deforestation and forest degradation is a serious problem and a major driver of global climate change. However, finding a single 'silver bullet' for halting the destruction of the world's forests is a difficult task; especially as it is becoming clear that finance and carbon trading may prove counterproductive, aggravating the problem instead of alleviating it.

Still, there are obviously no arguments for inaction. Strong measures against deforestation and forest degradation are urgently needed. As I have stated at previous seminars, we need to find solutions that tackle multiple problems simultaneously. For example, how may the Millennium Development Goals and poverty reduction be combined with ambitious action on climate change? In a similar vein, I believe that focusing policy exclusively on any single forest service – in this case, carbon sequestration – would be a dangerous approach. After all, forests provide an entire range of ecosystem services, all of which are important. The ambition should thus be to maximize the totality of those services.

Experience shows that the approach of simply allocating funds for forest protection, without addressing the underlying causes of forest loss, is neither efficient nor sufficient. Thus, international development cooperation programmes and activities will most likely need to be coordinated with any REDD system ('Reduced Emissions for Deforestation and forest Degradation') that may emerge in the future.

Also, emissions from forests and from fossil fuels are two separate issues and should be treated as such; thus, targets for climate change mitigation ought to be clearly differentiated between the two. For example, allowing countries to offset emissions from transport through forest protection or tree plantations in the tropics is not an attractive way forward. Not only because of the purely scientific uncertainty inherent in that sort of approach, but also because it would imply that increasingly, carbon would be "sunk" into the biosphere, while emissions from fossil fuels – the true source of our troubles – would be allowed to continue unabated. That is the reason why we are opposed to including forest-based carbon sink projects in the Clean Development Mechanism (CDM), as well as to linking REDD with a global emissions trading system.

As a final note on the topic of carbon sinks, in the long run the use of bioenergy should be promoted, provided it is produced in a sustainable manner. Since it is imperative that fossil fuels are completely phased out as soon as possible, using bioenergy to substitute for fossil energy is a step in the right direction. Still, bioenergy would form only a single forest service; and again, policy should be tailored to the entirety of the services that forests provide.

Niclas Hällström
Summary of an overivew study by Göran Eklöf

This study has been specifically commissioned by SSNC for this Key Issues seminar – and has the same title. It was written by Göran Eklöf who unfortunately is sick and can not join us in todays seminar.

The issue of forests, both boreal and tropical, is without any doubt one of the key issues in the climate change debate. This is in part due to the multiple functions of those forests.

First, they have a tremendous economic importance, providing or supporting the livelihoods of some 1.6 billion people as well as being home to 60 million indigenous people. In addition, for many of the communities living in

"Thus, slowing or halting deforestation and forest degradation will be less a matter of providing money for forest protection and more an issue of actually addressing the drivers of land use change in developing countries."

Niclas Hällström

tropical forests, the surrounding forest ecosystems form the basis for virtually every aspect of life: food and water, fuel, medicine, and more. Living in Western societies, it is hard to even grasp the completeness of that reliance.

Second, the ecological importance of forests should be obvious. They harbour four fifths of all terrestrial biodiversity. Moreover, forests provide essential local as well as global ecosystem services, such as soil formation, water purification, regulation of local climates, protection against floods and storms; and carbon storage. The uptake of carbon dioxide is only one of the many services that forests provide, albeit one with global significance.

REDD, as we have heard, is an acronym for Reduced Emissions from Deforestation and forest Degradation. It turns out that the definitions of these two concepts of deforestation and forest degradation practice are in some senses problematic, and will most likely be an issue in the climate negotiations.

According to the Food and Agriculture Organization of the United Nations (FAO), the technical definition of forests states that a canopy cover of 10 % or more must be present. If the canopy cover drops beneath that boundary, deforestation is said to have occurred. However, any loss of biomass that leaves at least a 20 % canopy cover is classified as being 'only' forest degradation, implying that most of the forest may be cut down without it actually being categorized as deforestation. The same may be true for loss of biodiversity or if the forest is converted to monoculture plantations. Consequently, the countries experiencing the most deforestation may not be – and indeed are not – the same as the countries emitting the most CO_2 from forests.

The financial mechanisms under the United Nations Framework Convention on Climate Change (UNFCCC) have so far provided funding only for projects related to afforestation and reforestation. Afforestation means the planting of new forests; reforestation is the process of restoring already deforested or degraded ones. The pre-emptive approach of actually reducing emissions from deforestation and forest degradation is only recently being discussed. Because roughly 20 % of global emissions of greenhouse gasses originate from forest loss, it is certainly wise to do so; the real issue is how to proceed. How can these sorts of practices be prevented in a way that is effective and sensible?

Unfortunately, experience shows that resolving the issues of deforestation and forest degradation will not be 'cheap and fast', as presumed in the Stern Review and elsewhere. It will not be easier, or not much easier, than the systemic shifts in transportation, energy and consumption urgently needed in our own societies. Even the World Bank recognizes that although 'combating the destruction of forests has been on the international community's agenda for the past three decades... little progress has been made so far in reversing deforestation trends in most tropical and subtropical countries."

Thus, slowing or halting deforestation and forest degradation will be less a matter of providing money for forest protection and more an issue of actually addressing the drivers of land use change in developing countries. This includes direct causes such as agricultural expansion, infrastructure development and commercial logging, but also indirect macroeconomic factors, such as taxes and incentives, global trade as well as consumption patterns in the North. Governance issues are also crucial, for example concerning land rights, democracy, and corruption. Obviously, addressing any of these factors will require time; and with solutions likely specific to different countries, political and economic systems, REDD is not a quick fix.

Given that this is the case, how are the negotiations shaping up? The general impression is that debates are taking place on several issues. The views of individual countries are sometimes unclear, their written positions being characterized by vague or convoluted wording; in other cases, viewpoints are very defined and articulated.

One debate concerns whether REDD should be a publicly funded system or a market mechanism. Some countries advocate instituting some kind of public REDD fund; others

are clearly in favour of a market-based approach. However, as the only function of market mechanisms is placing a price on carbon, they do not address capacity building or governance. Neither will they put any value on the various other forest services mentioned earlier. Also, because emissions from forest loss are so considerable, linking REDD to the regular carbon markets may mean that REDD credits risk utterly swamping the carbon market, causing irregular fluctuations in prices.

There are various other practical difficulties in designing a REDD system. For instance, what is the baseline that avoided deforestation and forest degradation is supposed to be compared to? That is, on what basis should countries or actors be rewarded for reducing forest loss? The baseline will have to be some 'alternative' future where no REDD incentives were in place. If, compared to that alternate timeline, deforestation drops, then it might be assumed that REDD has been successful. Yet how can such a baseline be quantified, when the whole point is that it does not actually happen? In fact, subjective assessments and guesswork, not to mention politics, would form the very basis for any REDD scheme.

Another difficult issue concerns which party to reward. Will, for example, indigenous peoples and local communities involved in forest protection be eligible for receiving revenues from REDD, or will the funds exclusively fall into the hands of national government and corporations? Also, if indeed the latter are intended as the main 'players' on the forest carbon arena, what safeguards are there that the rights of indigenous peoples and local communities living in forests will be respected? Or will they be swept aside as carbon sinks are secured by and for the market?

For that matter, will revenues accrue to countries or actors that have historically done well in protecting their forests, or to the ones that are making improvements? In essence, do we reward the good guys, or the bad guys? If the latter is the case, it may provide all tropical countries with an incentive to increase deforestation in the short term, in order to gain more REDD revenues in the long run.

Some conclusions might be drawn from all this. Clearly, there is a need for substantial new efforts to protect and sustainably use forests; but in ways that combine carbon storage with the development of local economies and recognition of the rights of communities. As one way of securing those rights, all new programs should be based on consultations with, and prior informed consent of, communities. Finally, more effort needs to be put into identifying and addressing the underlying causes of forest loss, including global trade patterns; and REDD ought not to be linked to markets for trading carbon emissions.

– – –

In a little while, Anders Lindroth will give an in-depth presentation on boreal forests. However, in the overview study written by Göran Eklöf, Jonas Rudberg of SSNC has also contributed a section on boreal forests, which I will now summarize. Northern forests are not being considered for inclusion in REDD, which only relates to the loss of tropical forests. All the same, boreal forests are a significant carbon sink, and potentially have a major part to play in averting catastrophic climate change.

According to the study, nature reserves seem to not only have a positive impact on biodiversity, but on carbon sinks as well. In contrast, there is little increase of carbon stock in production forests. Intensive forestry may certainly result in more carbon being absorbed by forests; however, this gain may well be offset by emissions from clearcuts. Thus, the net effect is, if nothing else, uncertain. Also, while there is a constant flow of carbon going to and from the atmosphere, only approximately 5 % of the carbon in forest products remain for very long periods of time, e.g. in the form of building materials. The argument that intensive forest production could and should be used to enhance carbon sinks seems therefore to be largely unfounded.

In conclusion, boreal forests alone will not solve the climate crisis, although they may make important contributions for example by supplying renewable energy. Most importantly, boreal forest carbon sinks should not be used as an argument against taking on other commitments.

"How do you make sure that local people on the ground are rewarded for protecting the forests, as opposed to REDD simply becoming yet another vehicle for enriching and empowering the elite? "

Meena Raman

Meena Raman.
The negotiation context – a perspective from the South

Much of the work of Friends of the Earth Malaysia, which I represent, is centred around supporting indigenous communities in conserving forests; defending them from governments using timber concessions as political rewards, defending them from the oil palm industry, from pulp and paper. Having worked with these issues for many years, we are becoming very familiar with the problems and threats related to conservation of forests.

The negotiations on REDD within the UNFCCC are increasingly being seen by developing countries as an opportunity to receive funds for addressing some of these problems and ultimately halting deforestation and forest degradation. However, many from civil society remain sceptical. After all, there is such a thing as corruption in governance, and civil society is regularly on its receiving end. This is not to say that there is any united developing country position on REDD, because there is not. Within the 130-plus countries of the G77/China, which is the developing country negotiating bloc, there is an entire range of positions on dealing with deforestation and forest degradation.

With REDD, the main issue being discussed is what financial incentives and policy approaches will be needed to achieve reductions in deforestation and forest degradation. There is also an emerging debate on what is now being called 'REDD-plus': providing an appropriate framework for forest conservation, sustainable forest management and 'enhancement of carbon stock'.

Some of this is quite worrying. 'Enhancing carbon stock' may imply planting monocultures of genetically modified trees. Also, what is the real meaning of 'sustainable' forest management? For instance, while the Malaysian government may claim to be managing its forests in a sustainable manner, civil society is, to say the least, not convinced. In addition, as we have already heard, the very definition of forests is contentious, and indeed, the FAO definitions allow monoculture plantations to be classified as forests.

But the main divide in deciding how to design and implement REDD runs between, on the one hand, using market-based mechanisms to secure funding, or on the other, setting up some kind of fund. This issue is closely tied to sovereignty: who is to own the forest? If forest credits are traded in an international market, it will mean that effective control of forested areas pass into the hands of actors other than sovereign governments, local communities or indigenous peoples. Finally, how do you ensure proper governance of these kinds of systems? How do you make sure that local people on the ground are rewarded for protecting the forests, as opposed to REDD simply becoming yet another vehicle for enriching and empowering the elite?

There is also heated debate on whether credits from reduced emissions could be used by Annex I (developed) countries as offsets to meet their own mitigation targets. That is, whether financially or otherwise supporting incentives for forest conservation in the South could be counted as equivalent to reducing emissions from fossil fuels in the North.

Yet another debate concerns whether or not countries that do not have a recent history of deforestation or forest degradation should be rewarded. After all, forests are a global public good; would it not make sense to also compensate communities that have always protected their forests for providing that vital service to the world community?

Finally, other issues include: whether or not financial incentives would cover forest degradation as well as deforestation; whether the gross or net emissions should form the basis for REDD; whether non-CO_2 emissions are also included; what baseline to start from when calculating emissions avoided; how to ensure the permanence of avoided deforestation and forest degradation in the sense that protected forests will actually remain so; and how to avoid leakage. 'Leakage' means the chance that, in this globalized world, deforestation avoided in one place will simply shift to another area where forest protection is less rigorous.

Finally, I will now shortly describe a proposal which was submitted by the Bolivian government, titled 'Proposal on REDD-plus financing.' Bolivia, as you know, is led by an

"REDD could contribute to poverty alleviation, and promote the rights of indigenous peoples. None of these benefits, however, will be achieved unless the UNFCCC process engages with indigenous peoples in a much more decisive manner."

Rukka Sombolinggi

indigenous president, and it is one of few countries in the world that support forests and indigenous peoples. This proposal was submitted to the Convention Secretariat and will be on the table in the official negotiations beginning in Bonn, Germany in June. According to the Bolivian proposal, in order to ensure the 'environmental integrity' of the system, REDD should be a fund-based mechanism. There will be no link to carbon markets, and thus, REDD will not be possible to use for offsetting domestic mitigation in developed countries. It protects the rights of indigenous peoples and local communities, as there is no transfer of ownership of forest carbon to the market. Finally, it ensures the national as well as local control of REDD-plus activities as well as allowing for the funding of forest conservation including adaptation to climate change. Bolivia has tied this proposal into the broader G77/China proposal on climate change financing through a UN-administered fund. Thus, REDD would be one of the activities funded by that mechanism.

In the Bolivian proposal there is also some elaboration on criteria for what REDD activities should be regarded as eligible. These criteria are quite interesting, as to a large they extent echo what NGOs have been calling for. Some highlights include addressing the underlying causes of forest loss, which would be a major step forward; clearly stating that REDD should neither allow industrial-scale logging to benefit nor promote conversion of natural forests to plantations. That might sound obvious, yet without proper checks in place, perverse incentives may arise. Once a forest reaches a certain age, for instance, it stops absorbing net carbon; and so, in order to absorb additional carbon, you would need to first cut down existing trees, and plant anew. Thus, from a purely carbon standpoint, it would appear to make sense to carry out extensive cutting of those mature forests, potentially implying massive conversion of virgin forest.

In summary, this Bolivian proposal is one that all of civil society really should be rallying around. Together with proposals by Brazil and Tuvalu, it is in fact the only one that does not prescribe market solutions for forest loss. Most developing country governments have opportunistic interests in keeping all options open, because refusing market mechanisms may leave them with less funds.

However, proposals from developed countries should also be monitored. The Norwegian proposal, for example, is especially interesting and contains some excellent elements, although unfortunately it combines these with a market-based approach. Also, as regards to indigenous peoples and REDD projects, the Norwegian proposal substitutes the established term of 'free, prior and informed consent' with 'free, prior and informed consultation'. Consultation and consent is not the same thing.

Rukka Sombolinggi
A rights-based approach to forestry governance –indigenous peoples' perspectives

I work for the Asia Indigenous Peoples Pact (AIPP) which, having been established in the early 1980s, now spans 16 Asian countries. Interestingly however, although the AIPP was established in Malaysia, its founders are no longer allowed to enter that country, and our offices have had to move to Chiang Mai in Thailand.

Speaking of Thailand and climate change, early this year many indigenous people were killed by a cold wave in the northern part of the country. It may be difficult for Swedish people to imagine how such a cold spell can kill, since the temperature 'only' dropped to seven degrees Celsius, which for Sweden is closer to spring than winter. In Thailand, however, it was the coldest temperature in the last fifteen years, and it caught indigenous people unprepared. In contrast, three weeks ago, the Bangkok temperature hit 40 degrees.

Since we already have had some introduction to the REDD issue, I will not repeat the points made but instead concentrate on the views of indigenous peoples. In April of 2009, indigenous peoples conducted a global summit on climate change in Anchorage, Alaska. It was attended by representatives from Arctic, North American, Asian and Pacific, Latin American and Caribbean, African, and

Russian groups. That meeting produced the so-called 'Anchorage Declaration', from which I will now present a few highlights.

The Declaration demands that Annex I countries take on the quite ambitious binding emissions reduction targets of at least 45 % below 1990 levels by 2020, and at least 95 % by 2050. States should work towards decreasing dependency on fossil fuels, phasing out fossil fuel developments and issuing a moratorium on new fossil fuel developments on or near indigenous lands and territories. At the same time, this process must not infringe on the right to development of indigenous nations.

The Declaration also calls on the UNFCCC to recognize the importance of traditional knowledge and practices in addressing climate change. This request by the part of indigenous peoples dates back even to the beginning of the negotiations on climate change; although request is actually not an appropriate word. It would be more accurate to say that this is an offer. After all, in many areas we have knowledge and practices that the world would benefit from; this is one way in which indigenous peoples are willing to contribute to addressing climate change.

Another point is that although most of the tropical and subtropical forests which are to be included in REDD are located in indigenous peoples' territories, there is no formal channel through which indigenous peoples may participate in the negotiations; all talks are handled by representatives of national governments. Thus, the Anchorage Declaration states that the decision-making structure of the UNFCCC should be reformed to formally accommodate the full and effective participation of indigenous peoples. In addition, it states that all REDD initiatives must recognize as well as implement the rights of indigenous peoples.

The potential of indigenous peoples' community-based and collaborative conservation of forests and biodiversity have been increasingly recognized over the years. For example, so-called 'community conserved areas' were recognized by the World Parks Congress in 2003. Community forest management may also be as effective as uninhabited parks at delivering long-term forest protection, and more effective when comes to delivering local benefits, including reducing poverty and promoting human rights. At the same time, pilot projects for REDD are starting up in various countries. These projects, initiated by multilateral bodies, most prominently the World Bank in cooperation with national governments, are being negotiated behind closed doors without the involvement of indigenous peoples.

Certainly, there are some issues with REDD. Who will determine what is to be considered the main drivers of deforestation and forest degradation? Will the role of logging companies and plantations be acknowledged? For example, at the moment some private companies are trying to promote tree plantations as a part of the solution to climate change. How can it be ensured that REDD does not lead to the resurgence of a 'fence-and-protect' approach to forest management? Many indigenous communities have had traumatic experiences with so-called 'protected areas'; for those people, conservation means evictions and human rights violations rather than the protection of nature.

However, there are some potential opportunities. Done right, REDD can indeed help to decrease or stop the destruction or degradation of forests. There is also a potential for reform of forest laws and overall governance, while strengthening the role of community-based forest conservation by indigenous peoples. REDD could contribute to poverty alleviation, and promote the rights of indigenous peoples. None of these benefits, however, will be achieved unless the UNFCCC process engages with indigenous peoples in a much more decisive manner. We are discussing this with the secretariat of the UNFCCC; so hopefully, an agreement will be reached on the participation of indigenous peoples ahead of the COP-15 summit in Copenhagen.

We are also working to include the views of indigenous peoples in for example the World Bank's Forest Carbon Partnership Facility (FCPF) and Forest Investment Program (FIP). In the latter, representatives for indigenous peoples

"In order to make the most of forests as carbon sinks, I think that we will have to manage them instead of simply leaving them be. One way of doing so is by continuous harvesting by thinning instead of clearcutting."

Anders Lindroth

have been offered membership on the Sub-Committee, which is to oversee the operation and activities of its pilot programmes. However, like the G77/China, indigenous peoples have yet to reach a common position on REDD, and so no decision has been made. This briefing represents one side of the debate within the global community of indigenous peoples; the other side is categorically opposed to REDD, and its positions should likewise be respected.

REDD pilot projects started in African, Asian/Pacific and Latin American countries in March 2009. In relation to these, we are working at the national and community level to increase awareness of climate change among indigenous people, and also awareness of indigenous peoples' issues in government. We are also working hard to promote REDD partnership between national governments, bilateral and multilateral donors, private companies, and indigenous peoples on the basis of community-based forest conservation and management.

Anders Lindroth
Boreal forests – a joker in the climate change game?

Having studied carbon balances in forests for many years, I hope to provide some insights into how these systems work, and how they can be expected to react in the future. The clock is ticking; emissions are still going sharply upwards, and something must be done fairly quickly. Thus, I will end this presentation with some recommendations in the shape of a climate 'wish-list' for the year 2020.

Regarding the effects of forests on the climate system, what is of greatest interest is the carbon exchange between the forest and the atmosphere. There are two opposing carbon fluxes. CO_2 is extracted from the atmosphere through the photosynthesis of plants; it is released back through two processes, autotrophic and heterotrophic respiration. Autotrophic respiration results from the activities of living organisms, whereas heterotrophic respiration occurs through the decomposition of organic matter.

This means that the concept of interest is the 'net ecosystem exchange' of carbon, which is the net flux to and from the atmosphere; the sum of these various processes. It is now possible to measure these fluxes with great accuracy over intervals of one half hour, using towers raised above the canopies of the forest. The fluxes are then summed over an entire day, where any sum above zero means a net emission to the atmosphere; and sums below zero means a net uptake.

As the next step, the net flux of each day may be summed over, say, an entire year. It turns out that, for instance, during the winter there tends to be net emissions from boreal forests, while in the summer there is net uptake of CO_2. The annual sum of all daily fluxes, the 'annual carbon balance', is then the very small number that is the difference of the annual totals of fluxes to and from the atmosphere. Note that even a very small disturbance on either of the two fluxes, being summed over long periods of time, may yield a vastly different net carbon balance.

This line of thinking can be globally applied. Presently, around 80 % of total CO_2 emissions is due to consumption of fossil fuels; the remaining 20 % is due to deforestation. Around half of these total emissions are absorbed by sinks in the oceans and the vegetation, while the rest accumulates in the atmosphere, driving climate change. Thus, without these carbon sinks, the situation would be much worse than it already is today. The amount that is absorbed by terrestrial carbon sinks is, however, subject to a great deal of interannual variability.

It is not known with any great certainty how much of incremental emissions are absorbed by the boreal forests; however, it is believed that it absorbs something in the order of 1-1.5 Gigatonnes of carbon every year, making it a significant part of total terrestrial carbon sinks. For Sweden, we have estimated, based on flux measurements, modelling and inventory data, that the carbon uptake is around 29 million tonnes per year. Every year, around 18 million tonnes of carbon are removed from forests through harvesting, leaving emissions of 11 million tonnes per year, which is a significant part of all Swedish emissions. Now, these figures

of course do not remain static over the years; they are dependent on several factors, including climatic ones.

Some risks and threats to the boreal forests have been identified. One of these is fire. In Canada, fires may determine if forests are a net sink or source of carbon from one year to the next. Another important disturbance, especially in the Nordic countries, is windthrow. In 2005, the hurricane Gudrun caused massive forest damage. Generally, windthrow causes huge forest emissions from the forest; larger, even, than emissions from clearcuts. Thus, the fact that it is not known how the incidence and severity of storms and fires will react to climate change, presents a major uncertainty when discussing net emissions from boreal forests.

What are then the opportunities for maximizing carbon uptake while minimizing emissions? There are three main avenues for improving the carbon balance of boreal forests: changing management practices, speeding up natural processes, and making land use more efficient. An example of the first approach could be changing the clearcut model that is normally used in Sweden, to one of continous thinning of the forests. Today forests are grown, completely cut down, and essentially reforested; replaced by new forests.

Here, forest age is a crucial factor, as obviously the net ecosystem exchange of a given forest is not static over long periods of time. For most of Europe, were you to plot the carbon balance against time, the curve would be approximately U-shaped; the early growth phase is characterized by many disturbances, causing net emissions during the initial 10-15 years. Although thereafter the forest functions as a carbon sink, it takes another 20-30 years until carbon uptake has compensated for initial emissions. Only after a forest has grown beyond that point, does it begin to act as a net carbon sink. For Sweden, it turns out that on average, only 50 % of potential forest uptake has been achieved by the time the forest is harvested. Thus, in Sweden at least, there is in theory great promise in increasing the carbon sink of forests. How a change in management might achieve this is currently being hotly debated in Swedish forestry, and there is much uncertainty concerning what is best practice. Still, if the average forest carbon uptake could be increased from 50 to 60 % of total potential uptake, it would correspond to 15 % of total Swedish emissions.

Secondly, speeding up, or indeed slowing down, forest processes. Nitrogen is the limiting factor for the growth of Swedish forests; because of this, fertilizing forests with nitrogen could be expected to increase plant photosynthesis, while at the same time decreasing respiration. Increasing inputs of nitrogen would then provide a double benefit to the net flux and a massive enhancement of the carbon balance over time. This has been shown by a number of scientific studies; one concluded that as a global average, for every kilogram of nitrogen added to forests through natural wet deposition, carbon uptake increased by 200 kilograms. Note, however, that this number is smaller for fertilization of Swedish forests. Another interesting finding is that the efficiency of carbon uptake is diminishing as nitrogen amounts are increased; simply put, smaller doses yield relatively larger effects. If two million hectares[1] were to be set aside for low dose fertilization, the additional carbon sink would correspond to 10 % of total Swedish emissions. The risk of causing emissions of N_2O would also be very small.

Thirdly, more efficient land use. We have studied the carbon balance of various ecosystems in the Nordic region. Most ecosystems have carbon balances that are relatively small; some are positive, some negative. The largest sources of carbon are natural disturbances, such as windthrow. Clearcuts are also a large source of carbon. However, afforestation of short-rotation forests has the potential to dramatically increase the uptake of CO_2. Short-rotation forests have the potential to absorb 5-10 times more carbon than traditional forests.

The wish for 2020 from my point of view, and hopefully that of the climate as well, is that actions that quickly increase the carbon uptake per unit of land should be prioritized. That means planting short-rotation forests and apply-

"Avoiding deforestation is also often seen as a cost-effective way of reducing emissions of greenhouse gasses."
Erik Eriksson

ing low-dose fertilization. Actions with low climate efficiency, such as producing ethanol, should be avoided. In the longer term, it may be possible to some extent to replace fossil fuels with forest residuals; however, this is not a quick fix, and it will take time before such practices actually lead to lower emissions. Finally, changing silvicultural practices to reduce emissions will require much additional research as well as, I daresay, a great deal of lobbying.

For the future, forest disturbances will most likely increase globally. While fertilization of Swedish forests may prove a feasible short-term option, I find it unlikely that silviculture will change much, in Sweden or globally, or that afforestation of short-rotation forests will be carried out on a large scale.

Erik Eriksson
The position of Sweden and EU on REDD

As my task is to outline the Swedish and EU positions on REDD, we now return once more to discussing tropical forests. Much has already been said regarding these issues, but I will repeat a few points. Deforestation and forest degradation currently accounts for about 20 % of global greenhouse gas emissions, yet there are no incentives in the first commitment period of the Kyoto Protocol to avoid these kinds of emissions. Avoiding deforestation is also often seen as a cost-effective way of reducing emissions of greenhouse gasses. Thus, including REDD in a future regime is crucial to ensure success, and I consider the talks on REDD since the Bali summit to have been quite constructive, especially concerning methodological issues. Still, some challenges remain, some of which have already been discussed: by which mechanism to allocate the funds; how to avoid 'leakage' of forest loss; the uncertainty inherent in measuring deforestation and forest degradation; and how to secure various co-benefits of REDD, such as addressing biodiversity, poverty or indigenous issues.

The EU and Sweden believes that tropical deforestation should be reduced by at least 50 % by 2020, compared to current levels, and that the global loss of forest cover should be halted by 2030 at the latest. Also important is promoting the role of conservation, sustainable forest management and enhancement of forest carbon stock. When it comes to forest practices, some tropical countries clearly do better than others, and some countries fare better in terms of combating deforestation; the EU wishes to build on and reward the good examples. After all, as much as we need to halt deforestation where it is occurring, we need to also prevent it in those places where currently it is not.

Indeed, one reason why the G77/China is not united on REDD is that there are vastly different deforestation rates between individual developing countries. At the end of the day, the differing opinions on REDD boil down to the simple question of who will get funded and who will not. Because leakage of deforestation and forest degradation is such a fundamental issue, we believe that national circumstances must in all cases be addressed, and that any REDD agreement should be based on national level accounting. REDD should not be regionally based, as a purely regional system may have the adverse effect of shifting deforestation and forest degradation between regions within the same country, instead of being reduced throughout the nation.

Any REDD mechanism should be performance-based, meaning that the extent of avoided emissions must be verified in order to count towards targets. Also, we believe that REDD must address the kind of co-benefits I have already described.

In the end, however, the entire issue comes back to money and financing. We are of the view that REDD should be a part of whatever overall financial regime emerges from the negotiations. It should also take into account existing financial mechanisms and instruments, as it is prudent to ensure that existing systems actually work before creating new ar-

1 1 According to the FAO, total Swedish forests cover around 27,5 million hectares.

rangements. The fact that REDD funding needs to be both predictable and sufficient necessitates the involvement of the private sector. However, developed countries should still be expected to assist developing countries with the technical as well as financial support necessary for building the capacity and readiness of developing country institutions to implement REDD policies.

In the discussions on REDD financing, as well as in the wider debate on climate financing, there are two main options. On the one extreme is the adoption of a market-based approach in which developing countries that reduce their emissions from deforestation and forest degradation below some pre-determined baseline receive carbon credits, which they could then sell on a global carbon market. The other extreme would be a fund-based approach relying on contributions from developed countries to a global 'climate fund'. Developing countries, provided they have put together some kind of action plan, could then apply for financing from such a fund. Of course, these two main approaches could be combined to form any number of different regimes.

Now, there are issues with both of these overall approaches, at least as I have stated them. One of the main concerns with the 'pure' market approach is that linking REDD to the overall carbon market may threaten the stability of that market. The number of credits which would be awarded for completely halting deforestation worldwide is about three times the number of credits currently included in the European Emissions Trading System. Thus, large and sudden reductions of deforestation and forest degradation may impact strongly on the carbon price on global markets. Now, there are plausible ways to deal with such instability, such as imposing a price floor on the carbon market. Another way of doing so, in fact, would be for developed countries to take on stronger mitigation targets, which would increase demand for carbon credits. As we have heard, yet another option would be the 'dual-market approach', in which REDD is completely separated from the conventional carbon market.

On the fund-based approach, there is naturally a concern on behalf of developed countries that actions promoted within the REDD framework are relevant, and that results are verifiable. Another concern is that the fund-based approach will generate neither sufficient nor sustainable funding.

The majority of negotiating parties, with the exception of the countries mentioned by Meena Raman, are in favour of some manner of market-based mechanism for REDD. The EU believes that the optimal solution would be a combination of fund-based and market-based systems; public funding will be necessary for capacity building and other governance issues, while at the same time it is likely that some connection to the market is necessary for generating funding of sufficient magnitude.

However, it is not all about governments and funds. The effective implementation of REDD in a future climate agreement will also depend on the involvement and cooperation, through multi-stakeholder processes, of local communities and indigenous peoples. The EU position is that such groups should also be involved in monitoring and measuring REDD projects.

Finally, I might add that things are indeed moving ahead rapidly in the negotiations on REDD; yet, as REDD will have a strong impact on the overall climate agreement, full agreement may have to wait until all or most of the other issues on mitigation, adaptation and finance are resolved.

Panel conversation and interaction with the audience

Remark. Anders Lindroth. I would like once more to emphasize that the clock is ticking. For several years now, the emissions have exceeded the worst-case IPCC scenarios. Despite the financial crisis having struck in the second half of 2008, still emissions have not dropped but instead continue their exponential increase. This fact really is deeply alarming. It is absolutely imperative that we take urgent and effective action; we quite simply do not have the luxury of waiting.

Question. Meena Raman. It is a rare opportunity to be sitting next to a member of an official delegation, and I will not waste it. What is your view of the issue of offsets in relation to forests? A major concern of civil society in the global South is that the EU, including Sweden, seems to consider offsets central to overall mitigation strategies. We have been highly critical of the EU 20 % reduction target for 2020, because it appears that a large part of that target is made up by offsets; and indeed, with action on forest loss as a large part of those offsets. How do you respond to these concerns?

Answer. Erik Eriksson. As I understand you, you are referring to REDD credits being used as offsets for developed country mitigation targets. The EU believes that offsets could be a way of making countries take on tougher mitigation targets than would otherwise have been the case.

Question. Meena Raman. Although I acknowledge that this seminar should not be turned into a debate, I feel that I must react to this statement. For me, mitigation targets refer to domestic cuts. Thus, it is incorrect to state that when offsets from forests or other sources are included in a given domestic target, this would somehow yield a 'tougher' or 'more ambitious' target than what you had before adding those offsets to the mix. Efforts should be made on tropical forests, but on top of tough mitigation targets at home. Are we saying the same thing?

Answer. Erik Eriksson. As to that, I am unsure. I have one clarification to make, however. The 20 % target for 2020 is only applicable if there is no agreement on climate in Copenhagen. Should other Annex I countries take on ambitious mitigation targets, the EU is prepared to raise that figure to 30 %. Even if REDD were to be included in such a system, it would be leaping to conclusions, to say the least, to assume that the entire 20 % or 30 % figure would be met through REDD credits. That is not how the system is going to work; in one way or another, it will yield additional emissions reductions.

Remark. Niclas Hällström. There are interesting connections here to the issue of cost-effectiveness, which incidentally will be the main subject of a forthcoming 'key issues' seminar. The pro-market argument of Erik Eriksson and others is that linking REDD to the carbon market will be necessary to generate enough funds, because public funding alone will not be sufficient. However, pursuing that route will, at least to some extent, lead to emission reductions shifting from domestic cuts in developed countries, to reductions in forests. Of course, those are still reductions. But after all, the root of the problem is not really deforestation, but the burning of fossil fuels. Thus, allowing REDD credits to be counted as offsets towards mitigation targets implies that where it really matters, in the energy production and consumption of the North, less is being done then would otherwise have been the case. The logic is of course that reducing emissions from deforestation and forest degradation is cheaper and quicker. And yet, such an approach means additional delay to the structural and systemic changes that will in any case be necessary for developed societies to undergo, if devastating climate change is to be avoided. Forest protection must be on top of much more ambitious domestic cuts within Annex 1 countries.

Remark. Erik Eriksson. I am not of the view that there is a dichotomy between domestic and foreign emissions reduc-

tions; I believe both kinds are needed. Crucially, I do not think that all emissions cuts should be done abroad, through REDD or other mechanisms. Quite to the contrary, my view is that most of the emissions cuts should be domestic. However, I also feel that market-based mechanisms will be needed to allocate the money for reducing deforestation. One question that should be central to the entire objective of halting climate change is where the money for mitigation and adaptation will come from. After all, enormous amounts will be needed. Market mechanisms are simply about raising the money, because what can be made available from public sources is not enough.

Remark. Niclas Hällström. And yet, the funds provided by corporations and other actors in a market-based scheme could just as well have been used for lowering their own emissions. A REDD market system would allow them to buy forest-based emissions reductions instead of doing so.

Remark. Erik Eriksson. This is also an issue of what targets are set within, for example, the European Trading System. If the targets are ambitious enough, buying REDD credits will not be enough from the point of view of an individual company. It will need to take additional action. It all comes back to what targets to set.

Question. Emma Lindberg, SSNC. The EU, as has been said, has formulated a 20 %, possibly a 30 % mitigation target. However, those targets are phrased in such a way that it is practically impossible for an outside observer to reach any conclusion as to what they are meant to consist of in terms of domestic or foreign cuts. And, as Meena Raman has argued, as a matter of principle the EU should make it clear that those targets would be met through domestic reductions.

However, even when compared to the stated ambition of the EU on preventing dangerous climate change, those targets are much too low. Viewing the development challenge and the climate crisis as dual objectives, the only reasonable level of ambition is at least 40 % reductions for 2020 in developed countries, in addition to the financing of at least equivalent reductions in developing countries. What are the ways that Sweden can help to shift the focus of the climate debate within the EU to such targets; to a discussion that is actually up to date on what, according to science, is truly needed to avert climate catastrophe? This needs to happen as early as possible, preferably before Copenhagen, but should at the very least be an issue for the years to come.

Answer. Erik Eriksson. Again, if there is no agreement on climate, the EU will only commit itself to a 20 % cut. Remember though, that if there is no agreement, that goes for REDD as well; and so I strongly doubt that much of that 20 % target would be met through any forest-based offsets. On the other hand, even if a deal is struck, it really is much too early at this stage to speculate on when, how and to what extent that target would be met through REDD credits. As to how Sweden could lead the way, we have formulated a national goal of 40 % reductions until 2020. Not many countries that I know of have taken on targets that are tougher than that; doing so is then one way of trying to influence the debate on climate change, not the least as Sweden will shoulder the EU presidency on the first of July this summer. Finally, even the 20 % reduction is actually a very ambitious target. It may not sound like it compared to the recommendations of the IPCC, but it is very ambitious compared to what has been declared by other Annex I countries. So in that sense, the EU is taking the lead.

Remark. Niclas Hällström. This issue, while somewhat off topic, cuts to the core of the climate challenge. Yesterday, there was a debate on climate change in the Swedish parliament. One of the participants was Johan Rockström, executive director of Stockholm Environment Institute, who presented the analysis of SEI on this issue. It is based not only

on the science, but also on which countries bear the main responsibility for the problem in addition to the capacity for resolving it. Their conclusion as to what would amount to Sweden's fair share is that we should take on reductions exceeding 120 %, some of which is naturally to be done in other countries. Also, note that this conclusion is based on conservative IPCC data; not the more recent and more alarming science of the last few years.

There is a major gap between the science and what is considered politically realistic, a divide which we touched on in the first seminar in this series, where Johan Rockström also participated. So what is needed is both very aggressive domestic cuts, and in addition to those, extensive action on climate change in developing countries, done through REDD or other means. In any case, the total reduction by 2020 for a country like Sweden should be at least 80 % and possibly, as indicated by SEI, 100 % or more.

Question. Lars Rydén, Uppsala Centre for Sustainable Development at Uppsala University. The forest agenda in climate negotiations is very important for many reasons; both biodiversity and development depends on it. However, there is another aspect which has not yet been mentioned here: carbon in soil. In my view, soil carbon is even more important than carbon in forests and vegetation, because it allows for agricultural development. Although from a technical perspective, soil carbon may be more difficult to accurately monitor, the World Bank at least considers it a vital carbon sink. Thus, combating desertification is as important as halting deforestation.

One could actually say that action on climate change as hinges on three agendas: fossil fuels, forest carbon and soil carbon. All of those have issues that need to be resolved, and various ways of going about resolving them; yet it is unfortunate that only the first of those three areas seems to be the subject of media coverage and debate. How can all of these issues be incorporated in the negotiations?

Please note that I am not implying that soil carbon is a substitute for phasing out fossil fuels; however, I am curious as to the position of the SSNC on these issues, as I understand that most environmental NGOs are opposed to enhancing carbon sinks on the basis that it will mean less action on fossil fuels.

Answer. Erik Eriksson. This depends on whether you are discussing soil carbon in developing countries, or in developed countries. To some extent, soil carbon is actually already included for Annex I countries under the heading 'Land Use, Land Use Change, and Forestry'. Soil carbon in developing countries is currently not included, although there are some proposals on the table from developing countries on including, on a project basis, enhancement of soil carbon in the Clean Development Mechanism.

Question. Ulf Rasmusson, Friends of the Earth Sweden. There has been some discussion on the relative merits of a market-based versus a fund-based approach in REDD. One of the main arguments against a fund-based mechanism, apparently, is that public funds will be insufficient to deal with the challenge. Would it not be possible to solve this problem by channelling into a REDD fund money generated through auctioning emissions rights to carbon markets? For example, you could earmark some percentage of auctioning revenues. Such a scheme would utilize the market to generate funds, but then allocate them to various projects through a fund. Are there any comments on this; any moral implications or negative impacts? Would it not be possible to generate all the funds needed without risking the kind of backlash which may result from, for example, linking REDD credits more directly to the carbon market?

Answer. Rukka Sombolinggi. The issue of fund-based versus market-based mechanisms is another where there is no consensus among indigenous communities. There are some

cases, for example in the Philippines, where indigenous communities have managed to make use of market mechanisms such as the Clean Development Mechanism. Still, the majority of indigenous peoples are concerned that introducing market mechanisms will result in a loss of control of their territories. Who will control the carbon market; who will regulate it? These questions are especially important, as many governments have yet to recognize the legal right of indigenous peoples to their own land; indigenous territories should not be simply considered 'empty land' which foreign companies and governments can buy and sell as they please.

Answer. Meena Raman. Perhaps it should be clarified what is meant by fund-based and market-based REDD systems. The sources of funding are really a separate issue. For example, the G77/China proposal on an overall financial mechanism for climate change, which is a fund-based mechanism, states that 0.5-1 % of the GNP of Annex I countries should be contributed in addition to existing aid budgets. However, this proposed fund will also accept money from other sources, such as taxes or indeed auctioning of emission permits to carbon markets. Unfortunately, within the European Trading System, as well as within the American cap-and-trade system proposed in the Waxman-Markey Bill, most permits will actually not be auctioned, but given out freely. Still, there are some options.

We are however concerned about the Norwegian proposal on finance, which entails auctioning to a global carbon market of so-called 'assigned allowance units' or AAUs. But if allowances to pollute are assigned, who will decide the amounts assigned to each country, and on what basis will that decision be made? As is being argued by the Bolivian government in the negotiations, the current developed countries have already, more or less exclusively, used up all of the global carbon 'space' in the atmosphere. What little is left is now being fought over. Thus, assigning any more of the carbon space to developed countries amounts to perpetuating existing global inequities in energy consumption and development. The figures of 20, 30, 40 % reductions until 2020 are not even close to what is needed if there is to be environmental space for the development of developing countries.

There is a great deal of hypocrisy; when the developed country banking sector was on the verge of collapse, enormous amounts were conjured up overnight for bailouts. But when developing countries, not to mention the entire global environment, are threatened, suddenly all wallets are empty. I cannot accept the argument that there is no money for the climate, if there is money for Goldman Sachs. Lack of political will is the problem.

Answer. Erik Eriksson. In October 2008, the European Commission submitted a proposal on REDD. According to this proposal, developing country capacity building and readiness work for REDD would be financed by auctioning allowances to the aviation sector. Being a proposal, however, this is not an official line of the EU.

Question. Kajsa Lindqvist, Friends of the Earth Sweden. A very serious problem in developing countries is the expansion of industrial forest plantations, which have devastating consequences for ecosystems and local communities. How forests are defined in a REDD system is therefore of crucial importance. If plantations are accepted as eligible for REDD credits, how will it be possible to prevent virgin forests being cut down and replaced with monoculture tree plantations, which may or may not be more effective as carbon sinks? How do you avoid sacrificing biodiversity as well as local and indigenous communities in the name of halting climate change?

Answer. Rukka Sombolinggi. Indonesia is one country that has had large problems with plantations, especially oil palm plantations. Recently, companies have been describing their

existing plantations as a way forward in mitigating climate change. Yet, the establishment of those plantations entailed environmental degradation, biodiversity loss, human rights violations, and so on. Without safeguards, I think that more of the same is to be expected.

Answer. Erik Eriksson. You are correct in that creating the right incentives is a real dilemma. Of course, a system that promotes plantations at the expense of natural habitats would be counterproductive. One possible solution would be to create two systems; one dealing only with deforestation, and the other dealing with conservation of biodiversity, sustainable forest management, and so on. These are still controversial topics in the negotiations, however I agree that for example the biodiversity of forests must somehow be safeguarded within a REDD system.

Question. Jonas Rudberg, SSNC. Almost all Swedish forests are being harvested through clearcuts, removing 95 % of standing trees, releasing CO_2 and other greenhouse gasses. Anders Lindroth, you were recently quoted in the media as saying that 'clear-cut-free' forests and selective cutting would be better for the climate. Could you elaborate on that point?

Answer. Anders Lindroth. I also said that our data is really insufficient for drawing broad conclusions. However, the research done so far on thinning a forest indicates that the effect on the net carbon flux of the forest is small or nonexistent. 'Thinning' means that instead of removing all or almost all of the trees, as in clearcutting, perhaps only a fourth are harvested at a time. The reason that the net flux is unaffected is that the remaining trees very quickly take advantage of the resulting relative nutrient availability to grow their canopies; and thus, compensate for the emissions due to harvesting.

There are also many other environmental advantages of limiting clearcutting practices, so the idea that it would be optimal from a carbon point of view as well is certainly interesting. In order to make the most of forests as carbon sinks, I think that we will have to manage them instead of simply leaving them be. One way of doing so is by continuous harvesting by thinning instead of clearcutting. I should also clarify in relation to the earlier discussion on soil carbon that our studies measure total carbon fluxes to and from forests, including trees, underbrush, and soils. The entire system is analysed.

Answer. Erik Eriksson. Following the IPCC, the Swedish government believes that a balance needs to be struck between using forests as carbon sinks, for substitution of fossil fuels through bioenergy, and for substitution of materials. Therefore, some kind of restriction should apply when, for example, accounting for carbon sinks; forest carbon should not be counted in the same manner as emissions from fossil fuels. Otherwise, it is very likely that parties would seek only to maximize sinks and not take other forest services into account.

Remark. Frank Maramuzi, National Association of Professional Environmentalists (NAPE) and Friends of the Earth Uganda. I hear worried voices talking about the fact that emissions are still increasing instead of decreasing. I wonder if it is not, in a way, linked to the way in which these kinds of discussions are usually done. Here we are, considering vital issues but doing so in a closed room. Are we the ones who are supposed to implement our proposed solutions? No; those people are out there, in forests, in developing countries, and there are so many of them. They may not understand English, may not understand technical issues about carbon fluxes or economic incentives. Yet, very little is being said on how to reach them, how to explain these issues to them, how to ensure their participation in our schemes.

I also wish to comment on the issue of forests as carbon sinks. The argument put forward that forests, as they grow,

absorb less carbon and therefore should be cut, does not make sense to me. Rather, I think that if we follow that route, the large old forests that some of us are trying to protect will be lost.

Remark. Meena Raman. I agree, and I think that these kinds of arguments are being put forward in part as a way to justify conversion of natural forests.

Question. Anders Friström, Sveriges Natur Magazine. Try as I might, I cannot make sense of even the basics of REDD. The general idea is to pay money to someone as a reward for not degrading forests; yet how is it possible to prove that without the money, trees would have been cut down?

Also, who will get the money? The logging companies having the concession, the indigenous peoples living in and protecting the forest, or the state? Developing country states are in some cases extremely corrupt and uninterested in taking any action on the ground, in addition to them often having low-capacity forestry authorities. In fact, in many tropical countries, two thirds of logging is illegal. If the state has no control over what happens to the forests within its borders, how can we expect any improvements simply by paying them through REDD? Indeed, is there a point to paying them if illegal logging will in any case continue unchecked?

Concluding remarks

Meena Raman. The debate on REDD sheds light on the real difficulties of protecting forests. We cannot focus only on narrow governance issues; and, as Frank Maramuzi has said, we cannot only take climate change into account. In reality, deforestation in tropical countries is closely linked to development issues, which has been the experience when attempts have been made, for example, to ban logging. There are after all proponents of deforestation, and their argument is that logging creates income, jobs, and livelihoods. Thus, halting deforestation is, in a profound sense, to be fighting an uphill battle against the idea of what development means, and against global consumption and trading patterns.

Even before the debate on REDD, it was clear that if we really wish to halt deforestation, the underpricing of tropical timber products must stop, and the environmental costs of such products must be internalized. Raising the consumer prices of timber products would mean less consumption, and less consumption would mean less logging. Right now, however, tropical countries have every economic incentive to allow deforestation to continue, because the opportunity cost of leaving the forest intact is so small compared to the revenues from logging.

And so, we come back to the idea of REDD, which is all about raising that opportunity cost. But remember, the revenues from REDD would then accrue to the deforesting parties, while the ones conserving the forests would gain nothing. Our only hope is creating a system that promotes good governance on forest issues on the part of governments in tropical countries.

Anders Lindroth. Although politics is not really my field, I certainly acknowledge that it is crucial that we decide on an appropriate course of action. I am very concerned as well as increasingly pessimistic; but we will see what happens in the end.

Rukka Sombolinggi. As an illustration of the possible pitfalls of REDD, I would like to share the viewpoint of a friend in the Indonesian Department of Forestry. His reaction to REDD was excitement over the large amounts of money which would potentially flow into Indonesia as a result of that country having one of the highest deforestation rates in the world. That was all he had to say on the matter.

My final point is that the responsibility of developed countries should be considered when discussing climate change in general as well as deforestation. I am not only referring to the responsibilities of governments, but also of citizens; more discussion is needed on how developed country lifestyles affect people in other parts of the world, including indigenous peoples.

Presentation of speakers

Göran Eklöf

Göran Eklöf is a biologist and author with many years of experience working on environmental issues from a development perspective. He now works as an independent consultant covering a broad set of issues including climate change, international financial institutions and recently assisted the OECD in working with civil society for more efficient development aid. Eklöf has extensive experience from forestry issues in a development perspective and has spent considerable time in Asia.

Erik Eriksson

Erik Eriksson works on forest related issues in the international climate negotiations, and with Sweden's programmes on the Clean Development Mechanism (CDM) and Joint Implementation (JI) at the International Climate Policy Section at the Swedish Energy Agency. He has a background in business administration and did his PhD in the field of forestry governance. Before joining the Energy Agency he worked as researcher and teacher at the Swedish University for Agricultural Sciences (SLU).

Anders Lindroth

Anders Lindroth is a professor of Physical Geography at Lund University. His main research interest is the interaction between the climate system and different types of ecosystems, mainly forests and wetlands. He has studied the carbon balance of forests and wetlands and how the uptake and release of CO_2 is controlled by different climatic and other factors. He is coordinating a Linnaeus Centre at Lund University aiming at providing a better understanding of the carbon cycle and its interaction with the climate.

Meena Raman

Meena Raman is a lawyer from Malaysia, where she has worked for over 20 years with consumer, environment and development issues. Now working at the Third World Network (TWN) in Geneva, her primary area of focus is climate change where she follows the negotiations closely. TWN operates in close collaboration with governments as well as civil society organizations in the South, and as an adviser to the G77 has been instrumental in helping to design concrete proposals on mechanisms for climate financing. Meena Raman recently resigned as Chair of Friends of the Earth International, although she retains her seat in the Executive Committee.

Rukka Sombolinggi

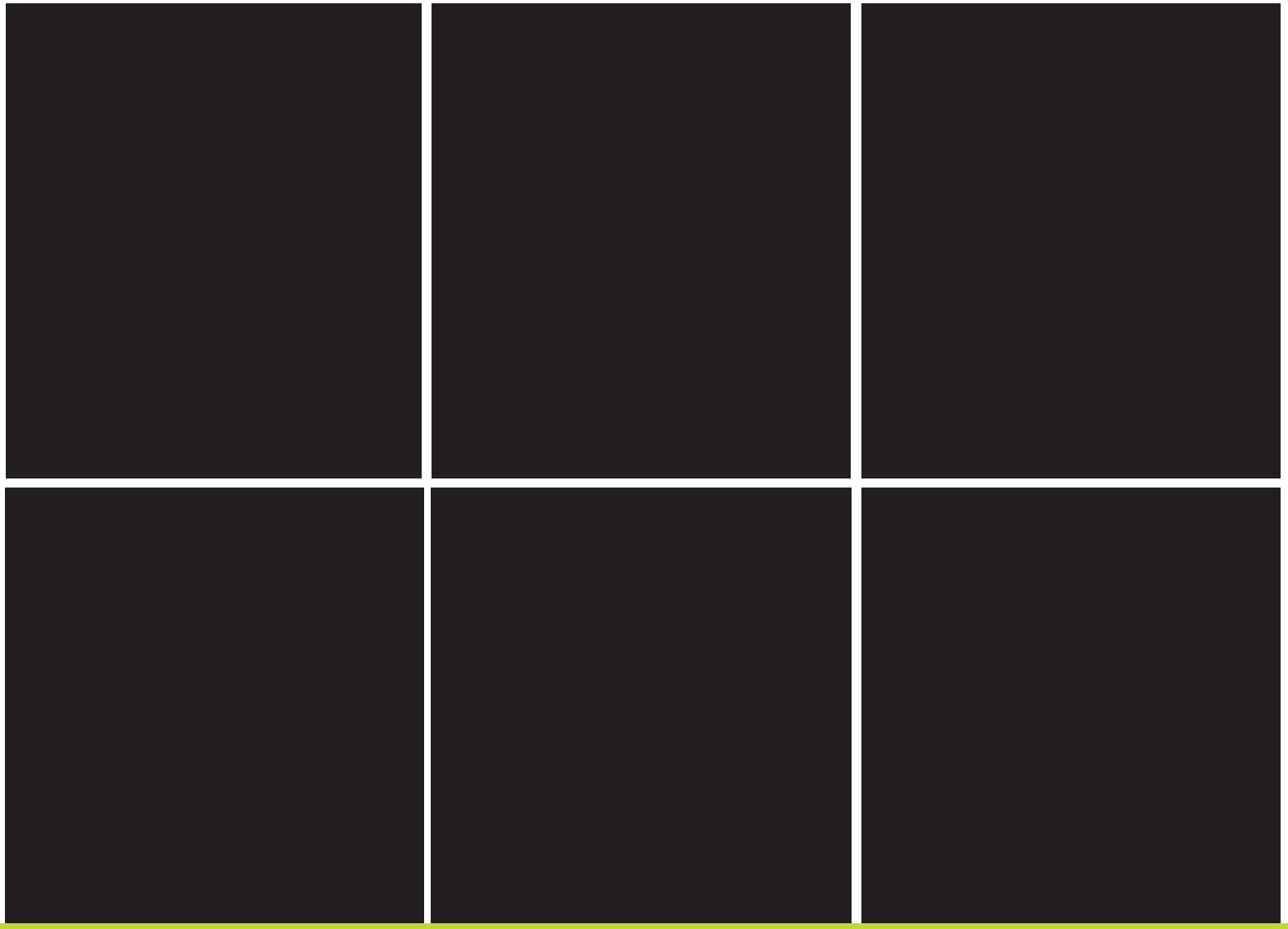
Rukka Sombolinggi is a Toraja who previously worked with the Indigenous Peoples Alliance of the Archipelago Indonesia (AMAN) and continues to serve as an Advisor to the organization. She now works as a consultant on indigenous peoples' issues and serves as Member of the Executive Council of Asia Indigenous Peoples Pact (AIPP) where she follows, among other issues, climate change and forests from an indigenous peoples' perspective.

Svante Axelsson

Svante Axelsson has been Director of the SSNC since 2000, having previously worked at the SSNC as an environmental economist and as head of the Environment Department. Svante Axelsson developed environmental economics as a subject at the Swedish University of Agricultural Sciences, 1988-1993. His work at the SSNC covers a broad range of environmental issues, but focuses on climate change in particular.

Moderator

works as expert on climate at the SSNC International Department, focusing on policy issues connected to climate and development. Before joining SSNC in 2008 he worked with the Dag Hammarskjöld Foundation for many years, and, before that, was part of creating the Centre for Environment and Development Studies (Cemus) in Uppsala, where he still teaches. He is presently setting up an independent initiative – "What Next?" – in parallel to the work on climate.



Seminar report from Seminar no. 4:
Winners and losers:

How maximise opportunities and minimise risks?

This fourth Key Issues seminar stepped back to look at some of the key challenges that cut across all the different areas of negotiations. The massive, necessary transfer of resources from the North to climate mitigation and adaptation in the South opens up for new possibilities, but also brings with it major challenges for international cooperation. What systems approaches are needed? What traps and 'false solutions' must be avoided? How can we learn from earlier successes and mistakes in development aid and north-south relations? How can the negotiations framework be improved and how do we ensure that the agreements and actions stemming from the climate negotiations translates into real, positive achievements on the ground where the poorest do not stand to loose?

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues4

Participants: Svante Bengtsson, CEO, REHACT AB, Maria Berlekom, Head of Team Environment and Climate Change, Sida, Lars-Göran Engfeldt, former Chief Negotiator and Ambassador for the Environment, Sweden, Bo Kjellén, former Chief Negotiator on climate change and Ambassador for the Environment, Sweden, Larry Lohmann, The Corner House, UK and the Durban Group for Climate Justice, Tony Tujan, Peoples' Protocol on Climate Change and IBON, Philippines, Svante Axelsson, Executive Director, SSNC Series coordinator and Moderator: Niclas Hällström, SSNC Summary by: Claes Ek The seminar took place: 25 May 2009, Kulturhuset, Stockholm Layout: Ingela Espmark Printed in: Stockholm 2009

www.naturskyddsforeningen.se

Winners and losers:

How maximise opportunities and minimise risks?

Svante Axelsson

Introduction

The theme for this fourth seminar on climate change is 'winners and losers'.

Of course, in one sense, it is unnecessary to make such a distinction. According to the most recent observations, the world is currently heading beyond the most pessimistic scenarios of the IPCC. At the same time, other studies show that it may be even cheaper than previously thought to reduce carbon emissions. A McKinsey study showed that initially, most of the costs of reducing emissions will be negative; the Stern Review showed that acting immediately will be cheaper than waiting. While urgent action will ensure that all of us are winners, inaction implies that everyone will lose.

In any case, the conclusion is that we need to combine our responses to the economic and the climate crises into a major global investment plan for renewable and sustainable solutions. In fact, it is clear from the McKinsey report that even if the menace of climate change did not exist, it still would make economic sense to reduce emissions.

The Swedish experience proves that it is indeed possible to reduce emissions of greenhouse gases while preserving growth and enhancing welfare: since 1990, Swedish emissions have fallen by roughly 10percent. One very important element in achieving this outcome has been implementing the 'polluter pays principle' through a tax on carbon emissions. New markets have also been created, most notably for bioenergy, meaning that reducing emissions have led to the creation of new jobs and livelihoods.

And so, the way forward is clear. What, then, are we waiting for? I believe that the main obstacle for progress on climate change is that the fact that taking action is both cheap and beneficial has not yet been fully appreciated or realised among policy makers. Also, unless they soon gain these insights, I think it will be difficult to produce a strong deal at the Copenhagen climate summit.

All of this is not to say, of course, that there will be no costs whatsoever. Although on an aggregated level it is perfectly clear that action must be taken immediately, that action will have significant distributional effects between, as well as within, countries. While the end-goal of climate policy is a society that in many ways is to be superior to that of today, on the road to that ultimate goal there will be losers as well as winners.

As an example, let us assume an emissions tax for gasoline or other transport fuels. Before efficient and environmentally sound substitutes are widely available, such a move could prove costly, not the least among people whose livelihoods are dependent on cheap transportation. The same kinds of issues apply globally. Measures such as taxes obviously need to be combined with policies for handling distributional effects, for compensating and supporting those who stand to lose.

One application of such an approach would of course be for developed countries to financially support mitigation policies in developing countries; this is a hot topic in the climate negotiations, and was also the subject of a previous 'key issues' seminar. However, for such a system to work, it is important not to focus on projects that are too easily carried out, especially if emissions reductions from these are to be available to developed countries as offsets to use in meeting their own mitigation targets. Developing countries will need such 'low-hanging fruits' for themselves. Instead, developed country financial support, and possibly offsets, will need to focus on projects that require either additional funding or the transfer of technologies currently unavailable in developing countries. I was very pleased to see this division into three categories being adopted by the European Commission in its paper on climate financing earlier this year.

Finally, it is clear to me that one of the main winners in the transition to fossil-free societies will be solar energy. To give a sense of the scope: in theory, more than all of the current global energy needs could be covered by placing

"In theory, more than all of the current global energy needs could be covered by placing large-scale plants for solar energy in the various deserts of the world."
Svante Axelsson

large-scale plants for solar energy in the various deserts of the world. The potential for solar to play a significant role is certainly there.

What is more, the price of solar energy is rapidly decreasing. Every time the production of such energy doubles, the price tends to drop by roughly 18 percent. The prices of conventional energy sources, however, are stable. It is my hope that cheap solar energy will soon become available worldwide; it is already expanding more rapidly than nuclear power. This is a particularly welcome development, as I consider nuclear to be one of the false solutions to the climate change challenge; and indeed, solar power is now expanding while nuclear power is being phased out.

Niclas Hällström
Introduction

While the issue of winners and losers is definitely both central and difficult, it is not one that is being explicitly addressed within the framework of the negotiations. Those discussions are, after all, much more technical and centred on finance, technology, and other such matters. In contrast, this seminar is about difficult questions that need to be kept in mind in any discussion on climate change.

Who will be the winners and losers? What are the real, or false, solutions? Most people are now almost entirely looking to the Copenhagen summit, and with good reason; yet the UN process is not the only channel for efforts to halt climate change. Do we need a broader political discussion as well? If so, which issues should be the main focus of that discussion? What are some of the underlying root causes to climate change that we need to tackle? This seminar is about getting ideas, perspectives, suggestions, and recommendations out into the open, for the benefit not only of the SSNC, but for all who are concerned with averting dangerous climate change.

Larry Lohmann
Climate as investment: The need to question 'established truths' and understand the political economy of climate change

In his introduction, Svante Axelsson has just described the need to invest immediately rather than a few years from now. Niclas Hällström has reminded us of the kinds of questions that sometimes tend to be lost as we grow increasingly frantic about the upcoming Copenhagen meeting and get all the more involved in technical details of finance, technology, development, and so on. I believe what is called for here is to take a step back from numbers and technicalities, and instead ask fundamental questions about the unquestionable need for massive investment.

First off, I wish to emphasise that the discussion about investment is about politics. The problem, basically, is how to stop using fossil fuels as quickly as possible. Essentially, although the carbon comes out of the ground, it does not go back in, but accumulates in the atmosphere and in the oceans. Most remaining fossil fuels need to stay in the ground; this is no longer in dispute.

How then do we achieve that? The usual debate on climate change tends to focus on technology, administration, diplomacy and the Copenhagen summit. One dimension that is often missing, however, is that of politics; especially democratic mass politics.

The whole business of setting targets tends to distract us from the more fundamental issues of the politics of investment. I have been working with climate change for a decade, yet it was only recently that I realised that the debate on targets is producing problems in terms of how we tend to think about climate change. This is because setting a target is not the same as leaving the fuels in the ground. Certainly, we can spend all day negotiating targets; but such an exercise will not in any way help us to answer the question of how to switch our economies to a pathway that is not dependent on fossil fuels.

The neoclassical economists, with whom I usually have

"Choosing the more expensive solutions today may imply cheaper ones tomorrow, as long as those first solutions puts society on the fossil-free path."

Larry Lohmann

very little in common, sometimes use a term which is of some value and which, to their credit, they are starting to take more seriously. That term is 'path dependence', meaning that what is done in the economy today matters for the future. What is done now sets a course that, once momentum builds, will be very difficult to change. Now, the path we are currently on depends on fossil fuels for energy production and transport; it is therefore everywhere very closely linked to those fuels. The other path, to which we need to switch, requires replacing our infrastructure, our energy system; our entire future history, in a sense.

That is not simply a matter of numbers; in fact, I find that the discussion on targets tends to cloud the fact that we must find a different path for our societies. As soon as carbon emissions are discussed in terms of numbers and cost-effectiveness in achieving those numbers, the idea of path dependence is lost because finding the cheapest way to reduce emissions by some number and until some future date may be directly contra-productive to finding the right historical pathway. In other words, choosing the more expensive solutions today may imply cheaper ones tomorrow, as long as those first solutions puts society on the fossil-free path.

Once again, let us ask the basic questions, and put aside the targets issue. What is fundamental to finding this alternative historical pathway? The first obvious answer is, as Svante Axelsson said, to invest in low-carbon energy. The trouble is that while many institutions already are – the World Bank, for example – those investments seem only to be viewed as complements to investments in fossil fuels. The renewable energy approach can only work if overall long-term investment moves away from fossil fuels, a pathway which the World Bank and most European governments are refusing.

Investment that prolongs the life of fossil fuel infrastructure also needs to be phased out. By this I am not only referring to exploitation, development and use of fossil fuel resources, but also to instruments which tend to encourage or sustain fossil fuel dependence; carbon trading is one very good example. Carbon trading was among others developed by Richard Sandor, who also was one of the inventors of financial derivatives in the 1970s. As one might expect from such origins, carbon trading is created in a way that it sustains fossil fuel dependency. Thus, in order for positive solutions to emerge, these schemes need to be phased out as quickly as possible.

The same goes for the search for fossil fuel substitutes, because in fact there is no substitute for fossil fuels. They are a concentrated and convenient energy source and work very well with the infrastructure that we have built around them. We cannot expect to find a substitute that will have all these qualities. Biofuels is a case in point; it is not possible to substitute fossil fuels with biofuels, because growing the feedstock would necessitate taking over nearly all of the agricultural land in the world. Nuclear power is also not an option, but for the opposite reason. While the energy concentration of biofuels is too low, for nuclear it is too high..

The only viable conclusion is then to promote local solutions; locally generated energy, locally adapted agriculture, locally appropriate transport. This in turn can only be achieved, I think, if the pre-eminence of Southern communities in future technology exchange is recognised. Often, when transfer of technology is considered, it is assumed that it concerns a transfer from those who possess technology to those who do not; that is, a transfer from the North to the South. Yet in the climate context, the opposite is really more accurate. Most of the interesting climate-friendly technologies are likely ones that were developed in the South and are widespread in the South even today.

Moreover, contrary to how it is usually understood, technology transfer has most often been the case of one technology overlaying another existing technology, which is then marginalised or destroyed. As an example, I visited a valley in India where a low-carbon agricultural system providing livelihoods for many people was threatened by nominally climate-friendly technologies in the shape of a

hydroelectric dam. The dam, certainly less climate-friendly than the technology already in place, thus threatened not only the livelihoods of the local communities, but also the transfer of their agricultural knowledge elsewhere. It follows that for the future, the focus should be on technology exchange rather than transfer.

Now, in order to share technology that actually is climate-friendly, certain obstacles will have to be removed. One of those is "development", or development as it is usually defined and has functioned in the past: a Northern-dominated process which spreads certain kinds of expertise and technologies across the world, technologies that tend to have been developed in the North, in the shadow of fossil fuels. For example, when the World Bank talks about transferring climate-friendly technology to for example India, it often turns out they are really promoting 'clean' coal plants.

In summary, conventional "development" should be viewed as an obstacle to the constructive and equal sharing of technologies. Another obstacle is the regime of intellectual property rights, which in recent decades has been spearheaded by Northern official organisations and governments.

Fundamental to overcoming these obstacles is for states, banks and research institutions to change their focus and to acknowledge, study and support how communities are already achieving – or have already achieved – independence of fossil fuels. It makes sense to take stock of the knowledge and expertise that is already available in dealing with climate change. In addition, issues of class, colonialism, race, local geography, and the politics of knowledge should no longer be avoided.

With the economic crisis, the increasing dominance of the financial sector in economics and politics has come into question. Likewise, that fact that finance is itself controlled by a very small elite has become a political issue in a way it was not only a year or two ago. That small group of people do not understand climate change; and even if they did, they would not have any interest in taking action.

This may then be an opportune time to ask the question of whether the public could take control of the financial institutions: not only the World Bank, but of the banks responsible for the credit crisis. Through the bailouts, some of these banks are already passing into public ownership. The control, however, is still not in the hands of the public. Thus, the final question, which flows naturally from and is central to answering the issues raised at the beginning of my presentation, is this. How can we build a political movement that takes advantage of the current crisis to question the dominance of the financial elite?

Tony Tujan
Messages from the South: The need for popular mobilisation

The topic for my presentation is very much connected to the conclusions of Larry Lohmann concerning the need for popular mobilisation. We have been organising on the ground for an independent, grassroots Peoples' Protocol on Climate Change.

At the Asia-Pacific Research Network Conference on Natural Resources, it was realised that climate change has brought us to a head; the climate issue demonstrates the key inequities as well as the unsustainability of the present system. More than being simply a matter of climate justice, it illustrates that we have arrived at a crossroads in history. The food crisis, the financial crisis, and other issues make it even clearer that a fundamental reorientation is needed in order to arrive at a solution.

The primary aspect of such a reorientation concerns development as it is known today, which is a process that is taking place at the expense of the majority of the people, as well as of the planet. Consequently, the issue of development was subject to extensive debate at the conference, for instance with many Southern non-governmental organisations rejecting the idea of "adapting" to climate change. In their view, agreeing to "adaptation" would signal acceptance and constitute only a postponement of the needed restructuring of global society.

"Climate change is no longer a future uncertainty, because the future has already arrived, with droughts, rising sea levels and increasing erosion of coastlines."

Tony Tujan

Industry and entrepreneurship are vital for creating dynamic societies; however, the issue at hand is the overdevelopment of industry in ways that are destroying the planet itself. We believe that the primary cause of this overdevelopment is the fact that science and industry has become dominated by monopolies. Thus, the issue is not corporations and entrepreneurship per se, but monopolisation of the corporate sector.

The reasons why Southern technologies become attractive is that they tend to be socially replicable, decentralized, and compatible with the environment. For example, it has been shown that organic or biodiversity-based agriculture can feed many millions, given proper development of technology. Still, many Southern technologies are admittedly backward, and will need additional research and development.

But on the whole, technology is not moving is this direction. Our solutions are being thwarted by the very same existing technological, scientific and economic structures that are in fact causing the climate problem; by the control of monopoly corporations over science and industry. Moreover, these monopolies also control our governments, which is why societies seem to be unable to move away from the perpetuation of the current industrial and technological order, despite there being a clear case, as well as potential, for reconceptualising what development means.

The traditional notion of development has been maintained by neo-colonial inequities throughout the world, meaning that besides technological or scientific inequities, there have been social inequities as well. The solutions now being proposed are premised on such inequities. For example, the World Bank funds that are supposedly for the benefit of poor countries and peoples, will actually serve to provide further revenues for the large corporations, adding insult to injury. Such solutions will only perpetuate, or even aggravate, the problems associated with traditional industrial development.

When it comes to addressing the many uncertainties of climate change, there seems broadly to be two approaches. One of these is that uncertainty in climate change can be managed in the same manner in which corporations address uncertainty. Unfortunately, this is the avenue pursued by institutions and, more dangerously, our governments. The result is discussion, as Larry Lohmann has said, concerning reduction targets of various magnitudes, carbon trading, and the monetisation of emissions.

The other approach is to acknowledge the nature of the problem, and to recognise that structural change of industry, science, technology, and society is needed. For us in the South, it is frustrating that this path is not being taken by governments and institutions worldwide; not because we know better, but because we bear the brunt of uncertainty when it comes to climate change. For us, it is no longer even a matter of uncertainty; it is a reality.

We are, for example, the ones facing the reality of super typhoons. Normally, the Philippines would have one every decade; in 2006, there were four, killing thousands of people. Climate change is no longer a future uncertainty, because the future has already arrived, with droughts, rising sea levels and increasing erosion of coastlines. Because of its many small islands, the Philippines has the longest coastline in the world, meaning that together with many Pacific countries, a large part of the Philippines will very likely literally sink beneath the waves.

Add to this the aggression we face in the name of development, in the name of improving our economic conditions, and it becomes clear that we have no choice but to mobilise. Not because we do not believe in our governments, but because that problem is such that popular pressure is required. Also, because many Southern governments are not very strong, there is a large potential for autonomous action; and so, we take matters into our own hands.

First, we need to mobilise to reject unacceptable corporate solutions, whether they consist of razing forests to build agrofuel plantations, or destroying coastlines and estuaries for prawn farms; and whether or not such solutions have the support of the government. The second point is just that: we

need to pressure our governments to genuinely undertake mitigation through structural change, and not simply focus on adaptation. It is not a suitable response to climate change to try to construct 'climate-proof' societies; especially if such adaptation is simply viewed as yet another business opportunity for corporations funded by export-import banks.

Finally, because we can no longer wait upon the government to do or not to do the right thing, we need to start implementing our own solutions independently. This is why we proposed to adopt a Peoples' Protocol on climate change. By drawing together the various aspirations of the people on climate change, we can better pressure the government to implement the solutions as we see them. Also, the Protocol works as a framework for promoting autonomous efforts for structural change. Finally, it helps to consolidate our positions on climate change, as well as to inform society as a whole on the issue.

We do not consider Copenhagen to be the culmination of our efforts; however, it is an opportunity for us to launch a set of national assemblies, globally linked through the internet, where the Peoples' Protocol will be put forward. This mobilisation is already taking place, and will be very evident on December 11th; hopefully in time to push an increasing number of governments to take clear action on the issue.

Lars-Göran Engfeldt
From Stockholm to Rio and Beyond

First, I would like to remark that it is a dangerous illusion to rely only on the technicalities of the climate negotiations. Climate change is a symptom of a much broader crisis, and it has been very interesting to see all three prior speakers emphasise this fact.

In this presentation, I will offer a few comments on the Stockholm-Rio-Johannesburg process, which spanned the years 1967 to 2002 and produced the Climate Convention during that time. There are some important insights to be gained from that process.

Generally speaking, the UN system including the Bretton Woods institutions[1] provides a unique platform for deliberation, as well as political legitimacy for actions at the national level. One of the strengths of this system lies in exerting long-term normative influence, a necessity for meaningful action to take place. Another is the potential for major breakthroughs provided there is sufficient will, unity, and resources. One successful example of sufficient political will is the remarkable Agenda 21 document; another success is the Montreal Protocol, which also highlights the importance of having adequate resources.

The weaknesses of the system lie, due to the tradition of consensus, in vague and diluted decisions. Perhaps most prominently, its shortcomings spring from the fact that it is a sectorial system that, due to increasing interdependence and globalisation, was obsolete already when the Stockholm-Rio-Johannesburg process was initiated.

This, of course, mirrors the situation at the national level; and it is a problem that has not changed since the 1960s. Especially since the Rio Conference in 1992, there has been increasing process coherence within the UN system; but the lack of national coordination has remained the main stumbling block. Consequently, each multilateral negotiation within the sustainable development area is supported by its own national interest group, with no coordination between different policy areas. This was very evident at the Johannesburg summit, in the Monterrey negotiations on Financing for Development, and in the Doha trade talks.

In addition to the issues having become more complex during the course of the process, the negotiators are often bogged down in technical details and tend to lose focus of actual results on the ground. This is a major complicating factor in terms of the much broader strategy which is now

1 The World Bank and the International Monetary Fund (IMF).

"The negotiators are often bogged down in technical details and tend to lose focus of actual results on the ground."

Lars-Göran Engfeldt

needed; however, I believe that the unstable financial markets of recent months, combined with mounting political pressure on the climate negotiations, may contribute to overcoming this obstacle.

Historically speaking, the Swedish initiative in 1967 to convene a UN conference on the global environment was a reaction to the ecosystem disturbances and destruction that occurred as human activities started to impact the entire planet around the middle of the last century. By the mid-1980s, this had led to a global environmental agenda that included climate change; however, the issue was mentioned already in 1968. It is only now, some forty years later, that we are starting to give this problem the serious consideration that it merits, showing the long lead-time that is often necessary in multilateral negotiations. In this particular case, it has become dangerously late.

It was very interesting to hear Mr. Tujan mention the crossroads facing us, because it was my impression, working within the UN process, that this crossroads was reached even before 1967: after the second World War. The overall dilemma was described even before the Stockholm Conference 1972 by Sverker Åström, who was the Swedish UN Ambassador and one of the chief architects behind that initiative. He wrote: *'It is one of the ironies of history that the principle of national sovereignty and equality received its triumphal confirmation in the Charter of the United Nations at the time when the introduction of atomic weapons, the development of communications, the rapid industrialization and the awakening consciousness of the environmental risk made it unmistakable clear that all of humanity is interdependent and that the old concept of sovereignty is inadequate.'*

In other words, even at the beginning there was a sharp contrast between the need of the UN process for vastly increased long-term governance, and the rigidity of short-sighted politics, as well as sectorial administrative systems.

In spite of these difficulties, the negotiations have yielded some results. Perhaps the most important achievement is that it has contributed strongly to a normative paradigm shift in terms of the artificial divide between humans and nature. That split, which in itself is a major underlying cause of the ecological destruction taking place, is now starting to dissolve. It has been stated that we are in the midst of a second Copernican revolution: while the first removed the Earth from the centre of the universe, the second removes humanity from the centre of the biosphere. Crucial to achieving these advances was the outstanding leadership of key individuals, for example Maurice Strong of Canada; as well as the availability of the UN as a global forum. Given the time it takes for normative shifts to occur, it was very important that the issue was included in the UN agenda at such a relatively early stage.

As I see it, there are some areas where progress has been made. These are: awareness building; the emergence of new diplomatic tools for sustainable development; the changing role of the state as recognition grows that governments alone cannot drive the sustainable development agenda; a deepened understanding of the development process, building from a focus on environmental issues and pollution as a threat to human well-being to the major breakthrough in Johannesburg in terms of operationalising the economic, social and environmental dimensions of sustainable development; and the acceptance regarding the inclusion of issues of ethics and security in the sustainable development agenda. These achievements form an important foundation to build on, and the world would have been in a worse situation without them.

There are, however, also some constraints that have largely prevented the practical application of the insights that I have just mentioned. These forces became dominant after the UN shifted focus from agenda development to implementation. National priorities now need to come into sharper focus; although most world leaders participated at both the Rio and the Johannesburg summits, these national agendas were not influenced in any tangible way.

A key symptom is the implementation deficit, which has

grown over the years and lies at the core of the challenges we face today. Many problems related to sustainable development would not have evolved or would have been solved more easily if agreements reached early on had actually been implemented. Instead, short-term political decisions with immediate popular appeal have continued to be rewarded. The political system has not been capable of rationally dealing with long-term planetary threats other than in a piecemeal and fragmentary manner, and reform of the obsolete sectorial systems that exist at all levels has been prevented. There are also very serious governance issues in many developing countries.

These problems have had several lasting effects. First, there has been a focus on symptoms rather than causes, with the result that national priorities have not been reconsidered. In the UN process, there has been far too little attention given to the policies of industrialised countries; consequently, environmental factors have not been integrated in economic decision-making and have left the environment being consistently treated as an add-on issue of limited political weight.

Second, in my view the controversy surrounding the additionality concept for environmental measures in development assistance has been used by both the North and the South as a convenient tool for keeping the environment a low-priority side issue.

Third, the very limited government coordination of national and international policies has allowed institutional fragmentation to continue, in spite of recommendations agreed upon from Stockholm onwards. Fourth, attempts to deal with complex issues by breaking them down into different components has since 1972 resulted in some 300 multilateral environmental agreements, of which the Climate Convention is one; this has led to almost complete loss of government control. In addition, these divisions have become increasingly artificial as the sustainability agenda has evolved; for instance, the agreements on climate change and biological diversity. Fifth, the international institutional deficits have affected the ability of governments to deal effectively with the major economic, social and environmental challenges of today. This, unfortunately, includes protection of the global commons such as the oceans, where proposals have been advanced since 1971 and consistently rejected.

Finally, severe global imbalances in human well-being and security have continued, despite some progress in certain areas. As a result, it is the countries of the South that are already, and will be, suffering the most from the sustainability crisis, of which climate change is only one aspect. This is untenable in what is now in fact a planetary civilisation, and it is fitting to recall the motto of the Stockholm Conference: *'Only one Earth'*. It should be added that the globalisation paradigm, which evolved after Rio, proved not to be the right answer to the challenges of sustainable development.

I will conclude with a few personal reflections on possible ways forward. I believe that a fundamental reassessment is now necessary. As we are all aware, after Johannesburg a series of systemic problems affecting a wide spectrum of sustainability issues has emerged. As a result, a further incremental approach is impossible if governments are to remain in control. I do not wish to sound alarmist, but there is a risk for serious systemic changes if the situation is not brought under control immediately.

A successful turnaround will require a political willingness to adopt a broad and coherent perspective that goes well beyond the present focus on climate change. Such a perspective must include readiness to accept policies that support lifestyles compatible with sustainable development. Western industrialised countries simply must take the lead, as they remain the global role model, and the shift will require broad crisis consciousness, as well as optimism.

There are three main of challenges that will first need to be overcome: resolving the North-South confidence problem; strengthening critical parts of the sustainability regime; and placing strong political emphasis on

"I also wish very much to stress that there are other development challenges facing the world, besides climate change."

Maria Berlekom

implementation. We need to take measures that go well beyond the UN negotiation agenda; for instance, the North should unilaterally remove agricultural and fishery subsidies and reduce its ecological footprint. In addition, the Bretton Woods institutions should be modernised and the foundation should be laid for a new GNP model that includes ecosystem services and more. Through all this, though, action at the national level remain key to ensuring success; thus, the highest levels of government need to be engaged in credible mechanisms for reforming and coordinating our obsolete government structures. We need to base all government and local community policymaking processes on the sustainable development concept.

Maria Berlekom
Learning from half a century of north-south development cooperation: messages to the climate community

I have had the opportunity of working with development cooperation and environment in a number of ways; as voluntary work at village level in Tanzania, at ministry level in Vietnam, within NGOs, and now at Sida, the Swedish International Development Cooperation Agency. I have also been able to follow the international environmental negotiation process, primarily regarding the Convention on Biological Diversity but also within the Climate Convention.

The primary starting point for my presentation, which will bring together some insights from these experiences, is that as Tony Tujan has said, we must acknowledge the fact that climate change is already upon us. And because it is already causing serious impacts around the world, regardless what one might think about the political implications, some degree of adaptation will be necessary.

The main losers are the poorest and the most vulnerable groups, and the poorest and most vulnerable countries. These are the people and countries that have contributed the least to the problem, and which have the least capacity to solve it. As a result, it should be perfectly clear that climate change is an issue for development cooperation as well.

Many of the problems associated with climate change are not new per se; for example, super typhoons or droughts have always happened. What are new is the increasing frequency, intensity and severity with which such events occur. There is a rising overall uncertainty and unpredictability brought on by climate change.

My second starting point is this: it should no longer be in any dispute that there is a vast need for additional funding, both for mitigation and for adaptation. Svante Axelsson showed that at least in the short term, there are financial gains to be made and that many policies will be fairly cheap; in the long run, however, adaptation at least will be associated with very high costs. Figures vary from a few billions to many billions, but the fact that adaptation will be expensive should not be disputed.

Coming as I do from development cooperation, I also wish very much to stress that there are other development challenges facing the world, besides climate change. Two billion people lack access to safe and modern energy. More than one billion lack access to clean drinking water; more than two billion lack access to safe sanitation. None of these challenges were caused by climate change; it will impose an additional burden, true, but the fundamental problems are already there. A number of such existing development challenges are embodied in the Millennium Development Goals; those targets remain unmet, and to some extent I fear that an exclusive focus on climate may cause us to forget about these other, very legitimate goals.

Also, when discussing targets and the implementation of policies already agreed upon, let us not forget the 0.7 percent GNP target for overseas development assistance which was reaffirmed in 2002 in the Monterrey consensus, and to which the EU has agreed. Although this target has existed for several decades, the world as a whole still is far from reaching it. That fact of course forms part of the fundamental trust deficit between the South and the North,

and will need to be acknowledged in any discussion regarding financial transfers for climate change.

The challenges, then, are multiple: the failing Millennium Development Goals, climate change, the destruction of ecosystem services. All of these form part of the overall challenge of achieving sustainable development.

Regarding the negotiations within the UN Climate Convention, I would concur with Lars-Göran Engfeldt that it seems very single-purpose and sectoral. This is reflected both in the fact that separate issues are very much negotiated separately, although there are signs of gradual convergence; and in that there is very little to suggest an overall vision with implications for other agendas, such as that of biological diversity or the development challenge.

At least until the last few years, the UNFCCC negotiations were primarily concerned with mitigation and minimising carbon emissions, which of course was largely correct. In this context of curbing emissions, the specifics have to a large extent been dominated by issues and solutions relating to science, technology, and finance. In addition, they tended mostly to involve the OECD countries and major emitting developing countries, such as China and India. To me, another striking feature was that financing was being discussed very much in terms of being project-based, ear-marked, and tracing particular funds to see that they were going the right place.

Negotiators tended to be officials associated with ministries of environment and in some cases ministries of finance, while participating NGOs were almost exclusively from the environmental sphere, whereas for instance the Convention on Biological Diversity saw representation from people-oriented organisations, indigenous peoples, and other social stakeholders. While these kinds of different viewpoints are becoming better represented, negotiations on climate change are still very much a matter of technical, scientific and financial issues.

As the impacts of climate change have in recent years become increasingly visible, and as the issue of adaptation is coming to the fore, a whole new set of actors are becoming involved. Not least among these are the poor and vulnerable countries, having perceived the effects of climate change on their natural environments and populations. In addition, as it is increasingly recognised that climate change will affect all countries and all sectors within countries, there is a growing awareness that it cannot be viewed in isolation as a purely environmental problem and that stakeholders in all sectors – water, planning, finance – have an interest in participating. Although these other stakeholders are not as active in the negotiations as one might wish, they are making things even more complex and interlinked than before.

What could then be the contribution of development cooperation to issues of climate? First of all, it could bring some fundamental values into the discussion, as development cooperation is about people, reducing poverty, and rights. Second, what development cooperation at its best does well is addressing multiple goals simultaneously and preserving a diversity of objectives: meeting social, economic and environmental challenges at the same time. Third, because issues of governance are central to development cooperation, there is a potential for providing guidance when trying to build capacity and institutions from the local level, all the way up to the global scale.

The fourth central contribution is that as by definition development cooperation concerns the transfer of funds, there are likely to be some insights concerning the financing of climate change policies in the South. I would like to highlight the fact that the general trend in development cooperation is now moving away from narrow project-based cooperation, to broad collaboration between countries and sectors. The experience has been that limited projects may in fact weaken the country in question.

For example, at the time I worked in Vietnam at the Ministry of Agriculture with Swedish-funded projects, there were 289 or so donor organisations to the Ministry; each with their own requirements for planning, reporting, and project contents. With such a mode of financing, it was

altogether impossible for Ministry officials to maintain any kind of independent priorities or long-term vision.

Obviously, a superior approach would be to simply make resources available while at the same time working with the Vietnamese Ministry to produce a joint agenda. After all, all the money in the world is of no use to a country without the capacity for handling and utilising it. Thus, the route currently being pursued is trying to avoid fragmentation and to instead build the long-term capacity of the recipient country. However, I fear that climate financing, in its current project-oriented form, may prove a detraction from, rather than an enhancement of, these developments.

When it comes to realising the mitigation agenda in developing countries, one might argue that development cooperation is ideally situated, as we are doing very strategic work and collaborating with all sectors of society and government, including for instance the energy sector. Also, for the implementation of the REDD mechanism which was discussed at a previous SSNC seminar, there are valuable experiences within development cooperation, as we have been working with building transparent governance in forest regions for four or five decades.

Regarding adaptation, the overlap with development as a whole should be stressed, as both are closely related to building the resilience of local communities and governments. Again however, if too much focus is placed on climate change, there could be risks, in this case of funds being shifted to recipient countries other than the poorest and most vulnerable.

Svante Bengtsson
Climate entrepreneurs: the role and challenges for business in tackling climate change and inequality

Albert Einstein once said that technological progress is like an axe in the hands of a pathological criminal. And it is true: technological improvements have a tendency to run out of control when put to uses that are too large-scale or are not appropriate given the original purpose of the technology.

My company, REHACT, works with the energy use of buildings, which currently accounts for around 40 percent of total global energy consumption. Specifically, our focus is on building comfort: heating, cooling, ventilation, and hot water, which are responsible for over 20 percent of global energy use. Our local solutions, based on locally harvested energy through the use of our own ventilation systems together with heat pumps, enable buildings to reduce their external energy needs by 80-85 percent. The payback time is less than a year for new buildings, and slightly more when retrofitting existing ones. Internationally, our design has won multiple awards, among others from the WWF.

We are currently looking at expanding into China, which as we know has a high level of new construction taking place: before the financial crisis, it amounted to 2 billion square metres annually. If our solutions were to be implemented in only 30 percent of Chinese construction, it would mean carbon emissions reductions of about one hundred million tonnes per year.

Now, 85 percent reduction of external energy needs might sound very good, and indeed, apparently some competition juries thought it sounded a bit too good to be true. Investing in new products will always entail some risk, true; and there is always a need to trust that what the salesperson promises is correct. Yet nothing ventured, nothing gained; and the gains we promise are substantial.

According to the title, this seminar concerns finding solutions that maximise opportunities and minimise risks. For me, however, that is business as usual. That is precisely what companies and government are already doing. Advancement will require an added element of risk.

Still, there are two different kinds of risk: real risk, meaning that the technology in question is actually not very secure; and perceived risk, which tends to be based simply on prejudice and a lack of information. As I have stated, it is the second kind that has been presenting us with problems, and I would argue that some government support is called for in covering the costs of that perceived risk. Certainly,

"Governments need to actively promote emerging players whose solutions are in line with the common good, while punishing companies that seek profit at the expense of all other considerations.
Svante Bengtsson

there are always a number of early adopters, people who are willing to buy that first hybrid car, and so on. Probably, most people in this room would fit into that category. Still, the fact that most people in society are not in fact early adopters presents problems for the swift diffusion of new and clean technologies.

Also, because it is very difficult to tell which technologies will be the most successful in the long run, there will be a need for diversification. As an example, some two decades ago there was fierce competition between the VHS and Betamax formats for home video; and although VHS emerged victorious, Betamax was actually superior in quality. Other examples are those of typewriters versus personal computers, and stationary versus mobile phones. In addition, it is a central insight that no technology will last forever.

I am not myself a great fan of football, but as I know that many people are, I will now present an analogy concerning the importance of rules by comparing the market to a football field. The players on the field are the various private companies. The judge is analogous to government agencies, whose task it is to make sure that the players or companies follow the rules. Those rules are themselves set by government, here represented by the International Football Association, FIFA. Finally, the supporters are the many consumers.

Let us assume that we wish to make a minor change to such a system, for example by imposing stricter rules against aggressive tackling. That might seem relatively straightforward, as the FIFA may not even need to change the rules: all it takes is for the judge to implement existing rules in a stricter manner. However, it will still require much effort, as in doing so the judge may become very unpopular among the players.

Now, imagine a large change: for instance, making sure that women's football becomes just as well funded as men's football. Or an even larger one, such as for example changing the fundamental rules of the game to accommodate multiple, simultaneous games of seven-player teams. You can imagine the time and effort associated with such a change, yet if there is potential for doing so, it will in this case lie with the FIFA; that is, with the government.

A real-world example might illustrate what happens when weak judges or vague rules leave players to run the game themselves. The Hammarby Sjöstad district in Stockholm was originally intended as a model of low energy use, with a stated consumption target of 60 or less kWh per square meter and year for heating and hot water. To this, however, the construction company objected, asserting that 100 kWh would be a more feasible target. Now, only a month ago the Swedish Royal Institute of Technology conducted a measurement survey of the Hammarby Sjöstad area, concluding that actual energy consumption now averages at 140-160 kWh, which is even higher than the current Swedish building standards of 110 kWh.

When players misbehave, they are forced out of the game; yet no one will exclude from the market companies that fail to live up to acceptable standards. This state of things is not satisfactory. Remember, the goal of all players is to win, to make a profit, within the context of the existing rules. If frameworks are unclear, some rule bending is to be expected. The main issue, however, is that government must resist attempts on the part of the old players, which I think are also the 'monopolies' referred to by Tony Tujan, to set the agenda.

Instead, governments need to actively promote emerging players whose solutions are in line with the common good, while punishing companies that seek profit at the expense of all other considerations. For that reason I was pleased to hear President Obama refuse to financially support the car companies unable or unwilling to manufacture products that are environmentally sound as well as profitable.

In summary, I believe that we will need to be open to multiple, unexpected solutions and that winners and losers will change as we progress. Today, I am perhaps a winner, but in ten years, who can say? Hopefully, by then solutions

will exist that are superior even to our 85 percent. Perhaps REHACT will develop them, perhaps not.

Finally, I do not think that we should spend too much effort considering the ideal way forward. In reality, we will need to take one step at a time. For example, while it is all very well to criticise ethanol, at the same time we need to acknowledge its part as a stepping-stone towards further and better solutions. My point is that we need to take the chance of investing in multiple solutions even if some turn out to be less beneficial, as will undoubtedly be the case. As Albert Einstein also said, we cannot solve our problems with the same thinking we used when we created them.

Bo Kjellén
A new diplomacy for sustainable development: What's needed to make climate negotiations fair and effective?

First of all, I would like to express some degree of concern regarding the theme of this seminar: 'winners and losers'. Of course, it might be said that while for instance the African countries stand to lose a great deal from climate change, regions such as Sweden will perhaps be less affected. But my own view is that we will all be losers, because we cannot know for certain what impact our human activities will have on the global systems. These kinds of global impacts are unprecedented; we are the first generation of humans to affect the immensity of the Earth system as a whole. Indeed, climate change is only one aspect of that influence; we are likewise affecting biological diversity, ecosystem services, and more.

In short, we are at a unique point in human history; as human numbers have grown, together with our technological capacity for interacting with the environment, so has our responsibilities to all future generations. What problems we face rest not with the planet, but with ourselves, with the human race. The Earth itself, of course, will outlast us; and there are, I think, other species ready to take over should we die out. That really is what is at stake, and it points to a need for change.

I was very impressed with what previous presentations had to say in regard to the need for a total change of direction. At the same time, having worked as a negotiator and civil servant within the reality of political life in democratic countries, I cannot help but feel that some caution is called for regarding the possibilities of achieving very radical changes.

It is of course a kind of political revolution that is being discussed here. Yet revolutions have been previously attempted, throughout human history, and quite often the consequences have appeared completely different from original aims and objectives. Looking at the Swedish political history and in particular that of the Social Democratic Party, it is clear that the overall strategy for political change has been one of reformism rather than revolution. At the same time, we certainly need radical visions in order to drive action.

I have recently written a book called 'A New Diplomacy for Sustainable Development'. Yet, during the process of authoring it I noted that such a new diplomacy is in a way already emerging in the shadow of the threat of global systemic changes. The global climate is not a negotiating party with which it is possible to barter; obviously, it is futile to ask of it to slow climate change down because humanity needs more time. Thus, all of the negotiating parties are in fact on the same side.

As Lars-Göran Engfeldt has pointed out, new conditions mean that the international system will need to be adapted. As negotiators, we are very much dependent on the instructions received from national governments, and those instructions are in turn dependent on what governments consider politically possible based on prevailing public opinion, pressure groups, and so on. In a democracy, those are the enabling conditions; and as a negotiator, you play the part of the middleman between the desirable and the possible outcome.

However, while democratic systems are sometimes slow in building momentum, once they start moving in the right

direction they can lend much strength to political processes. Even considering all the difficulties of the climate negotiations, I think that this could be the case on climate change as well.

As a side note, I was very struck by the reference to solar energy made earlier. In my view, a top priority for the EU ought to be to move decisively into solar energy and, in cooperation with African countries such as Mauretania, Mali or Burkina Faso, to begin constructing large-scale pilot installations for solar energy. I believe that projects such as these could go a long way towards solving the energy problems of the planet.

I will say a few words on the prospects for Copenhagen. The Bali Action Plan staked out the course for the future, and so I think there will be no sweeping or structural changes as to what the Copenhagen agreement will contain. Mitigation, possibilities for national action in developing countries, an increasing focus on adaptation, technology and technology transfer, development cooperation, transfer of financial resources; all of these are essential.

There are of course also other issues to be discussed which are very difficult to manage; for example, the claim made by several developing countries that climate change should not really be a question of development cooperation, but of a historical debt that the North has accumulated. It is true, since the beginning of the 19th century four fifths of the greenhouse gases added to the atmosphere have originated in the North. Yet, until recent decades most people were unaware of the problems associated with carbon emissions; therefore, this is a difficult political issue.

Still, I think it could be resolved if developed countries were willing to increase their amount of development cooperation. I agree with Maria Berlekom that the 0.7 percent target has lost none of its relevance. I consider it a shame that only five countries in the world – of which, I am happy to say, Sweden is one – have achieved that objective. If other, larger developed countries had done the same, things would look radically different. I am reminded of the words of President Kennedy, that we should transfer funds to developing countries 'not because the communists may be doing it, not because we seek their votes, but because it is right'.

Sweden is now set to assume the EU presidency, which at this time is a tremendous responsibility. There were some statements earlier that one must not focus excessively on setting targets; and although there may indeed be some truth to that argument, in the long term, some kind of targets will be necessary. The targets currently being discussed have been the basis for domestic preparations and internal negotiations, and so it will not be possible at this stage to radically change the agenda for Copenhagen. At the same time, there is both a need and an opportunity for innovative ideas on what are the right solutions that should be part of a post-Copenhagen regime.

But remember, underlying it all is the enabling conditions not only of political will, but of the capacity for governments to adopt certain positions. And in my view there is now great opportunity, as the fact that President Obama has taken office in the White House presents a unique window of opportunity. There will certainly be difficulties in Congress, of course, but we have seen that the Waxman-Markey bill has passed the first obstacles in the House Energy and Commerce Committee. Obama has the radical agenda of trying to bring together the economic crisis, the climate crisis, and the need for new investment.

As for visions of the future, I will conclude with a quote from prominent Swedish author and diplomat Rolf Edberg: *'Visions can be brought into the real if we really believe in them, and if we realise that we have no choice but to support the planet.'*

Panel conversation and interaction with the audience

Question. Niclas Hällström. These presentations have covered a vast spectrum of perspectives. The appropriate task before us would now perhaps be to bring them all together and hopefully reach some conclusions. I would like to set that conversation off by referring back to the presentation by Larry Lohmann. Although you made it very clear that we need to ask fundamental questions about the correct way forward, the agenda you proposed might appear very distant from current political realities and the actual negotiations which many of us are involved in, either as primary actors or as stakeholders trying to influence the process. What are the possibilities, not the least for civil society, for bridging that gap within the bounds of political realities? In essence, what is your theory of social change?

Answer. Larry Lohmann. I think I will begin with taking issue somewhat with the question, as that is always a good thing to do. In short, you asked how to achieve a change of direction, given that the right kind of politics is non-existent. But quite to the contrary, the politics is there; it is there in the form of the many groups, for example at the grassroots level, which are battling the dominance of transnational corporations and the destruction of natural resources. Climate is simply an extension of all the other issues of exploitation, inequality, unequal use of resources, and so on. For example, protests against oil exploitation, coal exploitation, pollution, abuse of local communities and communities of colour; all of these have been around for a very long time. What we need to do, especially in the North, is to recognise the fact that this is what climate politics is all about, and to make common cause with these popular movements and mobilisations and engage with their political power in a very raw and real sense.

Remark. Svante Axelsson. First, we need to realise that despite the climate issue having many connections to other problems, we cannot expect the Convention negotiations to solve all of these. If we try to include every worthy issue into the negotiations, such as the problem of the historical debt, it is likely that very little progress will be made.

Second, it would perhaps be wise not to take too long a perspective, as climate change will in practice need to be solved step by step. It is better to concentrate on the many win-win solutions that are already before us, and that policy makers and economists are blind to. The main argument for rejecting tough targets on climate change seems to be that action will be too costly; but in reality, because of the win-win aspect, the first steps will really be extremely cheap. Once we change their mindsets, I think that the UN negotiations will increasingly lose importance, as structural processes become self-sustaining.

Remark. Lars-Göran Engfeldt. The change of direction will happen, whether we want it to or not. The issue is whether or not we wish to be in control of that process, once it emerges. I fear that the challenge is broader than what is presently on the table in the negotiations, and that it will not be possible to include all of the aspects which are relevant, but now absent: the food crisis, the large-scale destruction of biological diversity, unsustainable consumption and production patterns. As Bo Kjellén has rightly pointed out, our main challenge is to improve the enabling conditions which limit the scope of the multilateral negotiations; and the best way to do so, I think, is by taking unilateral action outside of the negotiation table. I agree with the 0.7 percent target and the thoughts on capacity building and governance. Lastly, much potential lies at the local and subnational level, for instance by improving the budget procedures and governance of municipalities.

Remark. Bo Kjellén. I am concerned by statements that exploitation by multinational companies is the only relevant problem. I do not share that fundamental view of society. We created a globalised world economy because we were opposed to the protectionism of the 1930s. The GATT, the WTO and the Bretton Woods institutions are part of a

development that has led to considerable improvement in the living conditions of many developing countries as well. The problem seems to me to be that institutions at the international level are not sufficiently strong to set in place the framework for the global market economy. Setting up such a system will require a great effort that goes beyond a purely environmental focus; however I think that the enabling conditions are emerging.

The current situation is analogous to the abolishment of slavery in the 19th century. The main argument against putting an end to slavery was that the entire Western economic system was based upon owning slaves. Still the abolitionists were victorious. I believe that the same potential for rapid change exists today, but I fail to see how it would be accomplished by reducing economic interdependency, rather than strengthening international institutions.

Remark. Svante Bengtsson. I agree that we need a strong framework for the market, and I wish to add that this framework should be based on multiple, continuous steps instead of simply a single set of rules. For instance, the new British building standard is composed of a six-step programme, which is thus equipped to handle both the short and the long term. We should prepare ourselves for continuous incremental change in all parts of society.
As for exploitation by multinational corporations, I would like to point to employment as an underlying factor. Much of the exploitation taking place in poor countries is actually due to the fact that people need work; they need to earn a living. Therefore, we need to find better ways, such as ecotourism, in which to create jobs.

Remark. Maria Berlekom. Development cooperation can potentially aid in generating the wider enabling conditions mentioned by previous speakers. As I have said, development cooperation done well is by definition multisectorial and collaborates with governments and ministries while still trying to capture and include the roles and rights of local communities in national and international decision-making. In addition, development cooperation concerns collaborating with, as well as financially supporting various national actors and constituencies including NGOs, that can put pressure on their governments. Another aspect is to collaborate with the private sector while at all levels creating the enabling conditions, rules and framework for doing so.

Remark. Tony Tujan. At a meeting with donors and philantropic foundations on climate change which I attended, several announced that they are considering sub-national funding for climate change; I think that is the right way to go. The problem is that many donors lack clear policies, or have problematic ones. A number of donors are interested only in funding large infrastructure projects, neglecting systemic issues.

The main thrust should instead be towards local governments developing their own programmes and budgets. However, there is still a need for partnering, not the least in regard to new technologies. As an example, I came across a Norwegian company that produces mini-hydro power, which has less negative impacts on river systems. This is however completely unknown to the majority of those who would most benefit from it.

Therefore, the rules need to be changed, because it is the rules that then change the market. This is perhaps the main value of the negotiations: in creating new winners on the market, instead of maintaining those who ought to be losers, but instead manage to prosper through monopolising market chains and influencing political processes and thus, the very rules of the market.

A new catchphrase within the UN is 'new multilateralism'; this refers not to the relations of national governments, but to those of civil society organisations. This new kind of politics will play an important part for the future, and the question is: how do we harness the strength of civil society in cooperation with governments and donors?

Question. Annika Otterstedt, Team Environment and Climate Change, Sida. Despite the GDP measure clearly promoting the unsustainable use of natural resources, it is currently being used by donor countries, recipient countries and the Bretton Woods institutions alike as the indicator of development. Is it even possible to change the incentive structure of development without redefining GDP?

Answer. Lars-Göran Engfeldt. If the GDP measure could be changed, these discussions would be radically different, because the GDP of the South would be dramatically increased. As early as in 1968, Swedish economist Erik Dahmén published an influential book titled 'Put a price on the environment'. The present overall crisis opens a small window of opportunity for addressing the GDP measure in the same manner that the G20 have recently addressed financial concerns. Key to such an urgent and essential agenda would be, I think, democratic reform of the Bretton Woods institutions, as those are primary centres for cooperation between Ministers of Finance around the world.

Answer. Bo Kjellén. Reforming the GDP measure has been discussed for many years; in Sweden, for instance, one approach has been to quantify environmental externalities that are currently not included in the GDP. Although I agree with Lars-Göran Engfeldt, I think that including the environment in GDP will remain a challenge for economic theory. In the meantime, sound scepticism is called for because of the drawbacks of GDP.

Answer. Tony Tujan. IBON is also an economic think-tank in the Philippines, with a clear focus on explaining the complexities of economics and statistics to the people. As such, we have always taken the position that the GDP measure is fundamentally flawed as it does not reflect the true economic performance of our country and that it skews economic policy. As an example, the large-scale gold mining pioneered in the Philippines by the Americans during the first decade of the 20th century was so successful that the enormous amounts of gold being exported was not even added to conventional national export statistics. It is clear that an alternative system would require changing the entire framework; and that is exactly what we are trying to promote.

Answer. Svante Axelsson. In the short run, I do not actually think that we need to change the GDP or GNP concepts. This is because the Stern Review and other have shown that it is possible to prove even within the existing, admittedly flawed framework that rapidly reducing emissions is beneficial for society as a whole. In the long run, of course, there is a need for additional and complementing measures and concepts to provide a wider perspective of what welfare means. GDP is actually quite good at what it does; what we need to do is rather to recognise that the snapshot of the economy that it provides is extremely narrow. That is, the issue is to move beyond GDP, rather than seeking to replace it.

Answer. Maria Berlekom. Clearly, in the long term we need to ensure that environmental considerations are at the core of all decision-making including economic policy. Any and all tools to achieve that, including reform of the GDP system, should be utilised.

Answer. Svante Bengtsson. When I grew up in Sweden during the early 1970s, I would every year attend a ski camp, which would end with a two-run downhill competition. Interestingly, the winner of that contest was not the fastest skier. Instead, the winner would be the one with the most even performance, the least difference in the duration of the two runs; so it was about utilising your skills for attaining quality, not speed. I think that serves as a metaphor for the kind of GDP development that will have to dominate over the next fifty years: a competition over development done well, rather than quickly and indiscriminately.

Question. Dominic Walubengo, Forest Action Network, Kenya. The politics of development in the South is essentially

based on striving to imitate the advancement that has taken place in the North. In relation to the negotiations, there is therefore a fear on behalf of many Southern governments that because of climate change, they will not be allowed to develop as quickly as they would like, or in the direction of Northern countries. What is your view on the extent to which these concerns could obstruct a deal in Copenhagen?

Answer. Tony Tujan. The question of climate justice traverses several layers. One is the people. For us, climate justice is not about attaining the same kind of development that has been taking place in the North. Our countries, however, are controlled by elites that are certainly seeking to imitate traditional development. And even though that is not the kind of development that people at large are interested in, still we would support our governments when it comes to asserting the right to increase national emissions. That is not the most constructive of positions, I know. Still, it is essential that the North acknowledge that the right of the South to increase their emissions is every bit as valid as their right to do the same. In any case, it is my view that for Copenhagen no agreement is better than a bad one; at least then, we will still have the opportunity of starting over.

Question. Wahu Kaara, Kenya Debt Relief Network. Having listened to all of you, one overriding theme that stands out is the need for political good will for redressing structural issues. We also need to concern ourselves with what happens after Copenhagen, and for that very reason I am happy to be engaged with the Peoples' Protocol on Climate Change. In addition, listening to the account of the UN process from the 1970s up to today, I am reminded that when I was a young girl, it was said that by the year 2000 there would be water in every household; and indeed by 2000, there was no usable water even in the places were water flowed. These UN processes are simply about easing our consciences. We cannot escape the fact that doing the right thing will require courage. What courage does the world possess to learn from the South? Alternatives lie with and are manifested by the people. Development assistance has been tried before, in many shapes, and it has not worked; it is not going to work. How do we impress upon the negotiators in Copenhagen that there is a voice, face, and demand of the people for alternative solutions? The situation where civil society engages with these issues in parallel with the government must end; other stakeholders, especially from the South, need to take and indeed are taking centre stage and demanding that they be heard. I call upon all people of good will to listen, to be courageous, and to learn from the South, where alternative solutions are being demonstrated.

Answer. Lars-Göran Engfeldt. The North should certainly learn from the South; it lies at the essence of these issues.

Answer. Bo Kjellén. You are absolutely right in that the North has not been sufficiently open to Southern suggestions and solutions. When working with the Convention to Combat Desertification, we were constantly making the point that learning from the experiences of other drylands should form an integral part. With the emergence of modern information technology, I think the potential for such flexible learning is greater than ever. I would hope that the Convention to Combat Desertification, which has been spearheading some of the issues related to local communities, could play an increased role in negotiations on climate change as well; and vice versa.

At the same time, there has also been a lack of South-South cooperation, and thus I think that increased Southern consciousness will be extremely helpful. Increasing the engagement of the G77 governments on these issues will be all the easier if there is also strong participation on behalf of Southern civil society. I might add that many grassroots organisations, especially African ones, through participation in the negotiations had a considerable impact on the final text of the Convention to Combat Desertification.

Answer. Maria Berlekom. The North cannot in fact afford not to respect and learn from local and other knowledge systems of the South, which are equally valuable as the science and technology of the North. I also agree with Bo Kjellén that it is equally a matter of South-South learning. Whether and to what extent this will translate into political good will in the Copenhagen negotiations is however very much an open issue. It is in fact widely held that what happens after Copenhagen and in other fora is just as important as the outcome of the meeting itself.

I would also like to point out that just as there are differences within the Northern group, there are also vastly differing positions within the G77 group of developing countries. For example, there are several countries within the G77 that are strongly opposed to including local and indigenous perspectives in the negotiations. At the same time, there are also Northern countries that are very receptive to such viewpoints. We do ourselves disfavour in painting the world too starkly in black and white; just as there is undoubtedly diverging interests between the North and the South, there are also differences within both of these groups.

Concluding remarks

Bo Kjellén. There is no doubt that we need a transition for society, nationally and internationally. Climate change is pushing us in this direction, whether we want it to or not. It is not the end of the world if Copenhagen is not a complete success; however, we will likely never have a better opportunity for achieving success, with Obama as a strong President of the United States. Already next year, congressional elections are looming. Keeping in touch with the Obama administration as well as with the Group of 77, in order to keep the window of opportunity open for as long as possible; that will be a central task for the EU under the Swedish presidency.

Larry Lohmann. There are all sorts of debates going on at local levels around the world, in South Africa, India, Brazil; but also at the grassroots level in the United States and Canada. Touring around for two months among such North American communities, it became clear to me that these debates were not only about Copenhagen, Kyoto or any such conventional macro-politics, but about a struggle to reform local communities. For them, that was climate politics.

My main concluding remark is this. I have learned over the years that although when paying someone a visit, it is polite to let your host set the subject for conversation, there is a virtue to changing the subject when necessary. That is an insight which in my mind has been reinforced by this seminar.

If you are talking about Copenhagen, and that discussion does not seem to involve or lead to the issues you are interested in; change the subject. Protest outside the negotiations, take them over, turn them into a new Seattle, or set them aside in favour of more productive kinds of politics. If the debate on the 0.7 percent target, or on tougher targets for climate change, does not contribute to the practical implementation of necessary structural change; change the subject.

Is there an alternative GDP, an alternative way of reforming the World Bank, an alternative manner in which the bureaucracy of foreign aid could be conducted? That is an interesting discussion, and to be polite, you could participate in it for a while, but if that discussion is not leading you where you want to go; change the subject. As a result, over time the people who used to talk about all of these things will feel the need to themselves change the subject; while not defeated, they will have been set on the sidelines.

Presentation of speakers

Svante Bengtsson

is the CEO and one of the founders of REHACT, one of twelve 'Climate Entrepreneurs' selected and highlighted by Global Focus and WWF in 2008. REHACT has an internationally awarded innovative product that combined with traditional technology can reduce the external energy need of buildings by up to 85percent. Mr. Bengtsson has been educated at the Stockholm School of Economics and at Stockholm University.

Maria Berlekom

is Head of the Team for Environment and Climate Change at Sida. The Team works with integration of environment (including climate change) concerns in Sida's work, overall coordination of Sida's work on climate change, and ecosystem services including the marine environment. Before joining Sida in September 2008, she was Director of the Swedish International Biodiversity Programme, SwedBio, working with ecosystem services and biodiversity in a development and poverty alleviation context. She has lived and worked several years with rural development in developing countries, e.g. in Tanzania, Kenya and Vietnam.

Lars-Göran Engfeldt

entered the Swedish Foreign Service in 1965 and has been actively involved with the Stockholm-Johannesburg process during a major part of his career. He was instrumental in the preparatory as well as organisational work around the 1972 Stockholm Conference and also participated in the preparations for the 1987 initiative that led to the 1992 Rio Conference. He had a central role in the Rio process and was Vice Chairman of the Preparatory Committee for the Johannesburg Summit in 2002 where he was also co-chair of the Working Group on the institutional issues. He has been Ambassador in Nairobi and Belgrade, and was during 1998-2002 Environment Ambassador. He is just finishing a new book, 'From Stockholm to Rio and Beyond', with reflections on the UN system and sustainable development.

Bo Kjellén

is now retired from many years with the Ministries of Foreign Affairs and Environment and associated with the Stockholm Environment Institute. During his many years at the Ministry he was deeply involved in negotiations on sustainable development and climate change. He headed the Swedish delegation for the Rio process and the climate negotiations between 1990 and 2001, and also chaired the Negotiating Committee for the UN Convention to Combat Desertification 1993-1997. In 2007 he reflected on his experiences from environmental negotiations in the book 'A New Diplomacy for Sustainable Development'.

Larry Lohmann

works with the Corner House, a small research and solidarity organisation in the UK. He has worked on a broad range of issues, including climate change, racism, forest conflicts, development and the politics of cost-benefit analysis. In recent years he has focused much of his work on climate change and critical analysis of carbon trading. He was the lead author and editor of the Dag Hammarskjöld Foundation publication 'Carbon Trading: A critical conversation on climate change, power and privatisation' which has been downloaded in more than 500 000 copies. He is currently examining the potential impact of carbon trading on the financial markets and new speculative bubbles.

Tony Tujan

is the Executive Director of IBON foundation, a research-education-information development institution based in the Philippines. IBON is actively working across most sectors of society and plays an important supportive role for civil society organisations and social movements. Currently, IBON is involved with the global mobilising of the Peoples' Protocol on Climate Change which has a focus on both the

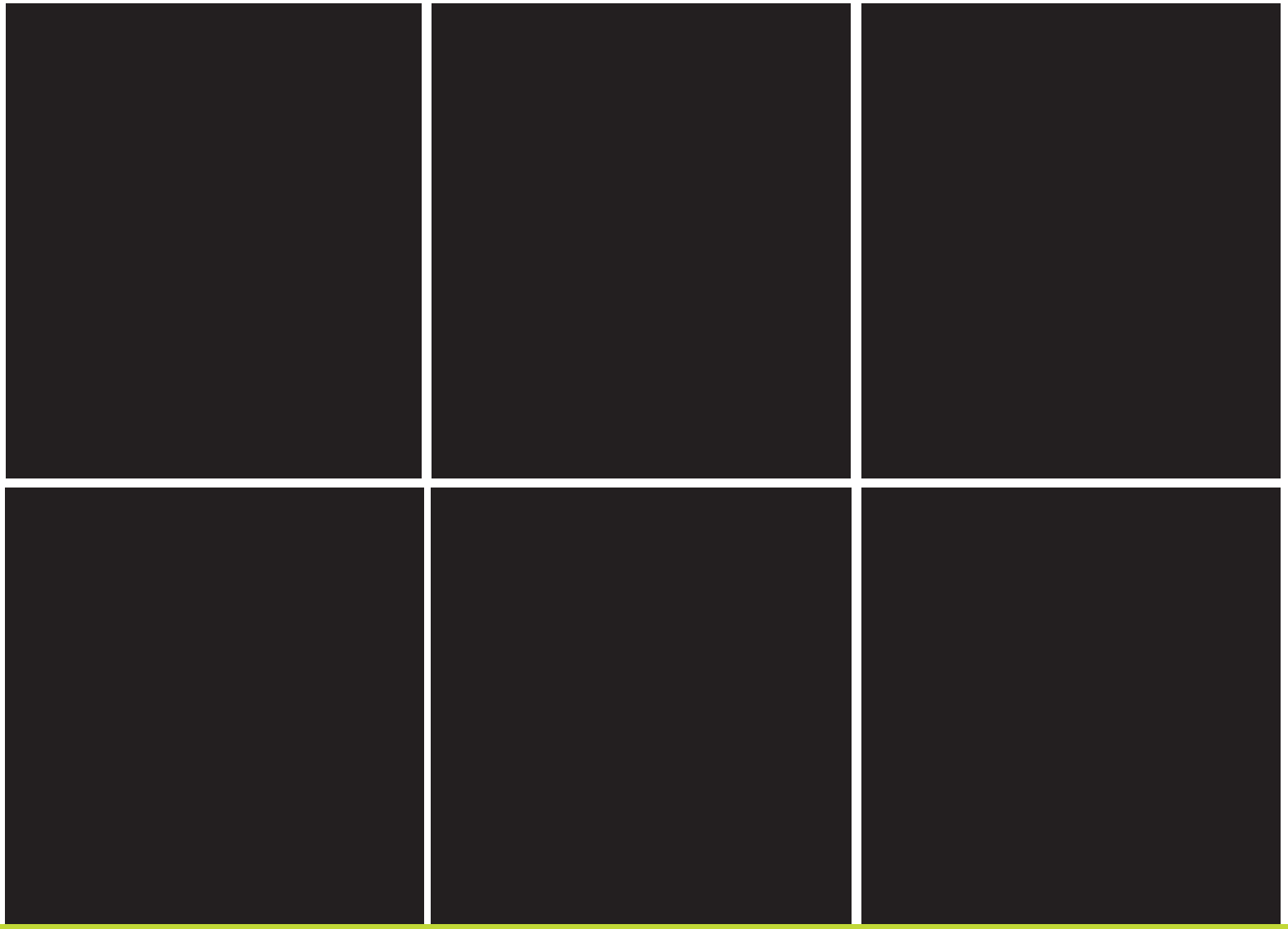
Copenhagen meeting as well as a longer-term social movement agenda. IBON and Tony Tujan were also much involved with the process on the Paris Declaration on Aid Effectiveness.

Svante Axelsson

has been Director of the SSNC since 2000, having previously worked at the SSNC as an environmental economist and as head of the Environment Department. Svante Axelsson developed environmental economics as a subject at the Swedish University of Agricultural Sciences, 1988-1993. His work at the SSNC covers a broad range of environmental issues, but focuses on climate change in particular.

Moderator Niclas Hällström

works as expert on climate at the SSNC International Department, focusing on policy issues connected to climate and development. Before joining SSNC in 2008 he worked with the Dag Hammarskjöld Foundation for many years, and, before that, was part of creating the Centre for Environment and Development Studies (Cemus) in Uppsala, where he still teaches. He is presently setting up an independent initiative – ”What Next?” – in parallel to the work on climate.



Seminar report from Seminar no. 5:

A Global Marshall Plan for Climate and Development:

Cost effectiveness and climate investments that make a difference

How can the world move, within just a decade or two, towards fossil-free societies where also the world's glaring inequalities are being addressed? What would be the main ingredients of a global 'Marshall plan' which achieves both these goals in a win-win manner? A new UN report argues that it is indeed possible to promote development while saving the planet, and that we need a public investment approach, where large resources are provided at an early stage and proven tools such as feed-in tariffs are used to subsidise renewable energy. This approach is different from the current focus in the climate negotiations on carbon markets and putting a price on CO_2. What approaches are the most appropriate? What is indeed most cost-effective? Are the ideas in the report something to take up for the Swedish and EU international leadership on climate change?

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues5

Participants: Eva Alfredsson, Swedish Agency for Growth Policy Analysis, Ola Alterå, State Secretary, Swedish Ministry of Enterprise, Energy and Communications , Tariq Banuri, Director, United Nations Division for Sustainable Development, Larry Lohmann, The Corner House, UK and the Durban Group for Climate Justice, Svante Axelsson, Executive Director, SSNC

Moderator and project coordinator: Niclas Hällström, SSNC Summary by: Claes Ek The seminar took place: 12 October 2009, Kulturhuset, Stockholm Layout: Espmark & Espmark Printing: Stockholm December 2009 www.naturskyddsforeningen.se/keyissues

Produced with financial support from Sida. Sida did not participate in the production of this publication and holds no position on the opinions contained therein.

A Global Marshall Plan for Climate and Development: Cost effectiveness and climate investments that make a difference

Svante Axelsson

Introduction

By the end of the Bangkok negotiations, it was clear to me and to many others that the main obstacle for reaching a good deal, or indeed any deal, in Copenhagen is the lack of trust between developing countries and developed countries. It obviously has not helped that Sweden and other actors are now discussing shifting to a 'single agreement', with contents unknown, instead of following up on the Kyoto Protocol.

Another major problem that is hindering progress is the lack of commitments on climate financing. This is tied to the fact that it may be difficult to secure enough financial resources for climate action without introducing major additional sources of funding. We also need stronger emissions targets for industrial countries, of course; targets that go far beyond the commitments announced thus far. But it is my view that in order to find a solution to this problem, we will need to go with approaches that present win-win-win situations: we need to combine our efforts to solve the financial crisis, the climate crisis, and also the poverty crisis, all at the same time.

We all know what needs to be done, but apparently we are still hesitant to do it. The Stern Review showed that it makes sense economically to act now instead of waiting. Most of the relevant technologies are already available, and so are the economic arguments for action; the time has come for policy makers to step up to the plate. It is my guess that what has so far deterred them are the possible distributional effects of strong climate policy measures.

While there are costs associated with acting on climate change, there are also benefits. In the negotiations there is much debate about burden sharing; but what about benefit sharing? Indeed, taking early action on climate change has made Sweden a winner: our dependence on oil has been drastically reduced, we are more energy efficient, and those of our industries that are at the forefront of the coming energy shift face an immense export potential. Thus, 'burden sharing' is in fact quite a dangerous word. What we ought to be discussing is benefit sharing.

As I said, solving the climate crisis needs to go hand in hand with poverty reduction. The rich countries world has the responsibility to take the first steps, and we must do so immediately; however, quite soon we will need to be joined in our efforts by countries such as China, India, and Brazil. That, among other things, is why we need to invest right now in a global technology shift: because the developed world cannot solve this problem alone, massive amounts of money must go from the North to the South in order the ease the transition of developing countries into low-carbon societies. Only by collective action can our collective challenges be overcome.

And so, we return to the financing issue; for how can we mobilise the funds for such a fundamental change not just to our societies, but to those of developing countries as well? Clearly, the climate crisis necessitates changing the consumer patterns of both households and the public sector. There are many figures on the costs of climate change currently floating around, but one benchmark may be that according to the UN, 500 billion USD will be needed every year for adaptation, mitigation and the protection of forests.

In contrast, the EU estimates that 100 billion euro will be enough; but according to their proposals the EU will only contribute 2-15 billion per year from public funds. Clearly, the amounts that, within the political mainstream, are considered possible to generate from public sources will not be enough. Thus, we will most likely need additional sources of funding. One such source might be a levy on the aviation and shipping industries. Such a tax would imply a 'double dividend': the double benefit of generating funds while also internalising the hidden costs of such sectors, essentially providing a much-needed correction of price levels to reflect true societal benefits and costs. It is promising that Swedish Minister of Finance Anders Borg is currently pushing for a minimum carbon tax within the

"One of the main advantages of a global feed-in tariff is that it would provide a massive boost to the demand for clean energy, thus driving economies of scale and significantly accelerating the decrease in both the cost and the price of renewables."
Svante Axelsson

EU. Such initiatives could go a long way towards funding EU climate investments abroad.

The overall conclusion is that we need a global, investment-based, 'Marshall plan' for the climate. The bulk of those investments will need to be private; nevertheless, large-scale public funds are key to directing private enterprise. As a result, the Clean Development Mechanism is not optimal and could only form a marginal part of the solution to this crisis. Instead, we need something more along the lines of the proposals made in the WESS report: a global feed-in tariff system for subsidising renewable energy. That, I think, would prove a strong mechanism for addressing climate change while providing clean and affordable energy to the two billion people that still have no access to modern energy services.

One of the main advantages of a global feed-in tariff is that it would provide a massive boost to the demand for clean energy, thus driving economies of scale and significantly accelerating the decrease in both the cost and the price of renewables. As soon as costs drop sufficiently, clean energy will move decisively into the mainstream, and hopefully also become cheap enough for the billions of poor people across the planet.

Indeed, the potential for renewable energy is vast: solar technologies alone could provide for all of the world's current energy needs. It is possible to build a global society relying only on renewables; there is no need to turn to uncertain and risky alternatives such as nuclear power. The fact that more solar energy than nuclear is currently being installed is, perhaps, a sign that this insight is spreading.

Niclas Hällström
Introduction

I have just returned from Bangkok after spending two weeks at the UN negotiations on climate. There, nations across the world negotiate action on climate change as if this was a zero-sum game, where no one may benefit without someone else losing. So far, the logic of the negotiations is still one very similar to that of global trade negotiations, where more than anything actors try to avoid committing themselves. Over the course of the two weeks, the trust gap between rich and poor countries only widened.

In that context, I think this seminar, and the proposal that Mr. Tariq Banuri will be presenting, is extremely timely. The idea is to move beyond the limitations and the mistrust of the negotiations and try to find some common ground in some proven mechanisms that are known to work and that could actually be implemented in a win-win context. Also, his proposed system is quite transparent and results-based, which could do much ease the concerns in the North about handing over very significant sums of money to regimes of the South.

For after all, this should be about finding the solutions around which a consensus could actually emerge. In this seminar today, we will explore ideas and mechanisms that could actually work, that would address equity and development *while simultaneously* tackling climate change – and which would also speed up the necessary transformation in the rich countries. It is a rare and liberating thing, I think, to find that kind of vision.

Tariq Banuri:
A global Marshall Plan for climate and development

As has been said, we have published a new report, entitled 'World Economic and Social Survey 2009: Promoting Development, Saving the Planet'. Because this report was very popular at the Bangkok summit, I have only brought a few copies with me today; however, it is also available for download from the Internet.[1]

First of all, relating to what has been said about burden sharing and climate policy as a zero-sum game, I have an observation to make, and that is that development has

1. www.un.org/esa/policy/wess

"The issue in the South is not the price gap between the energy that is climate-friendly and that which is not; the issue is rather the affordability of any form of modern energy. How to provide citizens with cheap energy services, including renewable energy, especially renewable energy: that *is the issue."*

Tariq Banuri

largely served as a 'positive-sum game': the promise of increased income for all creates greater prospects for cooperation within society. Where development gains have been distributed equitably, it has led not only to greater prosperity, but to improved stability, resilience, and social solidarity as well.

It is a concern to us at the World Economic and Social Survey that climate change is increasingly being seen as a zero-sum game, a view which is inhibiting cooperation and effective action. What we have done is to take a development-based approach to climate change, with the goal of transforming this into a positive-sum game.

Benito Müller of Oxford University makes a useful distinction between three different models of cooperation on climate change: sovereign, conditional, and joint commitments. Sovereign commitments means that each country makes independent commitments, so that the overall level of ambition is equal to the sum of those commitments; conditional commitments means that action is taken only if some external condition is satisfied, such as, in the case of developing countries, the existence of financing and technology transfer from developed countries. Obviously, most of what we have seen so far in the climate negotiations concerns these two kinds of approaches. But then there is also *joint* commitment, where two or more countries take on commitments together.

This is where our development-based work is focused. Is there a scope for joint commitments, and if so, what can be done? At the global level, we believe that there are in fact common goals. The North has the common objective of full employment and energy security, both of them obviously related to climate change. The South has the goals of catch-up growth and also of energy access because, as you will see, energy poverty is a major issue. Now, because of this geography of common goals, there are three kinds of issues that are of special promise. These are the areas on which we should focus.

First, there are the areas in which there is already consensus; where everyone agrees what needs to be done. Second, the areas where there is momentum; where already, steps are being taken and a process of change is underway. Third, the areas where there is transparency; where the relationships between inputs and outputs are not ambiguous, vague, or uncertain, but where the effects of policy are relatively clear. We believe that this focus will lead to results that are attractive to both developed and developing countries. It would allow developing countries to leapfrog to clean technologies; it would stimulate the private sector in both the North and the South; and most importantly, it would promote cooperation.

It could be argued that in most of the industrialised countries, the success criterion for climate policy is this: a successful policy is that which enables climate-friendly alternatives to become competitive in a market setting. However, we wish to stress that the success criterion for the South is not the same. The issue in the South is not the price gap between the energy that is climate-friendly and that which is not; the issue is rather the affordability of *any* form of modern energy. How to provide citizens with cheap energy services, including renewable energy, especially renewable energy: *that* is the issue.

We wish for a strategy that respects both of these goals. And indeed the main goal of our report is to sketch out such a strategy. Our proposal is based on what we call an investment-led approach, as opposed to a purely price-led approach. That is, putting a price on carbon is not enough; the public sector also needs to crowd-in private investment through its own strategic investments. In addition, we argue very strongly that investments should be front-loaded, in order to avoid the dangers of further 'lock-in' of carbon-intensive technologies, and also in order to take advantage of economies of scale and learning in these emerging industries. Finally, international transfers of finance and technology must be focused in a very targeted manner on achieving this 'big push' for low-carbon technologies. Those are the key messages of the WESS.

At this point, it might be asked why our proposal is so very much focused on energy. There are four reasons why. First, the contribution of energy to human progress has been phenomenal. The development that the world has witnessed for the last two hundred years or so has been inextricably linked to ever increasing use of energy. In fact, discovering how to access the concentrated energy contained in fossil fuels has utterly transformed our societies. It gave us clean water, hygiene and health, the ability to manipulate our surroundings in an unprecedented way. Just think about the miracle that we discovered; a miracle that is now about to destroy us, but a miracle nonetheless. A single gallon of petroleum contains the same amount of energy as a person working for three months, and yet without thinking we consume it all just by driving a car for twenty minutes.

Second, although energy use is essential for a whole range of human development indicators, access to energy is extremely unequally distributed. Two hundred and fifty years after the technologies with which to access fossil energy sources were first discovered, still that is the case. Thus, solving the development challenge will depend on the continued expansion of energy services in developing countries.

Third, that inequity is not due to inertia, but affordability. This is a fundamental point when considering the transition to clean energy, and I will elaborate on it in a little while. Energy use is also responsible for some 75 percent of total emissions, and what is more, energy emissions are rising much faster than aggregate emissions, especially in developing countries, where growth in energy use outruns energy efficiency.

Finally, we believe that energy is a sector in which there is tremendous momentum, consensus, and transparency. Focusing on this sector then becomes the obvious choice.

Now, some facts about energy. Worldwide energy use multiplied 30 times between the years 1800 and 2000; over the same period, GDP multiplied by a factor of 100. Mobility, as measured by the number of kilometres per person and day, has increased a thousand times over the last two hundred years. Once again, it is clear that the transformation has been tremendous; and I personally believe that it is this access to extra energy, together with the economic development it has made possible, that forms the basis for much social cooperation. It is because of energy that developed societies have found a way out of the Hobbesian trap of mutual distrust, rivalry, and violence.

Regarding the distribution of energy, we find that one might divide the nations of the world into three broad categories: low, medium, and high-energy countries. The nations where total primary energy use, as measured in kWh per capita per day, is low is also characterised by very low scores on the Human Development Index, so once more we see the strong correlation between energy and development. However, in addition, it is clear that the improvement curve describing the relationship between energy use and human development is very steep, so there are very large developmental benefits to be had from increasing energy use in these countries.

Moving on to the middle category, we find that the energy-development relationship is a great deal flatter, implying that the benefits from increased energy use are now less. And in the final case, for the nations with high energy consumption, which of course are also the richest countries of the world, the relationship is essentially a flat line. Thus, one might actually argue that much of the energy being used in Sweden and other rich countries is redundant, as it apparently does not contribute to human development.

The distributional differences are very great. For instance, the total primary energy consumption – once again, measured in kWh per capita per day – of the United States is almost fifty times that of Bangladesh. It is also the case that in very poor countries, almost all of the energy is for households. Middle-income, emerging economies tend to supply a disproportionately large share of energy to industry; for example, in China that share is 40-plus percent. Then, as countries continue to develop, the industry share eventually stabilises at around twenty to twenty-five percent.

But what is truly striking is the massive difference in

"[…] the common goal of developing countries is to make all energy cheaper, any joint commitments strategy must seek to rapidly lower the costs of renewable energy, so that renewables becomes the natural choice for developed and developing countries alike."

Tariq Banuri

electricity use between developed and developing countries. For example, the number of electricity kWhs per capita per day in the United States is nearly a hundred times larger than in Bangladesh, and over two hundred times larger than in Tanzania. And there can be no doubt about the importance of access to electricity; no country has ever been able to reach high scores on the Human Development Index, such as 0.8 or 0.9, without all of the population having access to electricity.

The inequality in energy access is truly fundamental to our discussions. From these figures, it stands out clear that there will be a need for additional energy in developing countries, simply in order to achieve higher levels of human development. But which kind of energy will it be? The answer is simple: it will be the kind that people in developing countries will be able to afford.

Let us examine this fact. What are the energy prices, in terms of cents per kWh, in different regions of the world? We find that in developed countries, the price of energy is generally around 10-20 cents per kWh. In emerging economies it is less, roughly 10 cents. And in low-income developing countries perhaps 4-5 cents. But how much people can actually afford depends, naturally, on their incomes. For instance, in India, the average yearly income is 750 USD. That translates to two dollars per day. Assuming that ten percent of the income is spent on energy, the average daily energy budget of an Indian citizen is twenty cents. If then the price of energy is twenty cents per kWh, no more a single kWh per day will be affordable.

Thus, the price and the affordability of energy are closely linked. Energy that is cheap is the one which countries will opt for, because that is the energy which can be provided at prices that people can afford. The Chinese favour coal which, at a price of roughly three cents per kWh, is affordable. Shifting to renewables costing perhaps fifteen or twenty cents would imply excluding significant parts of the population from access to electricity.

The strategies that developing countries use to solve the affordability problem are well known. First, as I mentioned, in many countries large segments of the population are simply excluded from access to energy. We have already heard about the two billion people with no access to modern energy; that is half of the population of the developing world. Although from a health and environmental perspective biomass is anything but cheap, states often find it less expensive to shift these people to burning firewood instead of providing them with modern energy. Another strategy is of course to reduce the quality of the services provided: cheaper buses, appliances, inefficient but cheap energy technologies.

Finally, the most important strategy that developing countries use is targeted subsidies. In developed countries, industry pays less for energy than does households; in developing countries, the reverse is true. Low-income households pay less for energy, high-income households and industry pays more. Similarly, the prices of diesel, kerosene, and petrol are kept low to stimulate public transport and other important sectors of society. An excellent 2007 study by the World Bank identified that subsidies that are specifically targeted on societal benefits are in fact quite efficient, in contrast to many other kinds of subsidies.

Now, returning to the climate issue, we know that there is pressure on developing countries to mitigate, by some calculations more than even developed countries themselves. If we are to stabilise greenhouse gas concentrations in the atmosphere at 450 parts per million of carbon dioxide equivalents, and developed countries cut their emissions by 20 percent, then according to the science, developing countries will need to make a cut of 25 percent against the 'business as usual' baseline. If developed countries cut by only ten percent, developing countries will have to cut by thirty percent against the baseline; and so on.

The picture is clear: if we want to arrive at 450 ppm, we need to bring about greater cuts. The challenge is to reconcile these demands with the problems of energy access and the need to maintain growth. Once again, there are two approaches: by sovereign commitments, or by joint commitments centred around investment.

The main strategy for promoting renewable energy within the 'sovereign commitment' approach is as we know to raise the price of conventional, carbon-intensive energy by the use of taxes or cap-and-trade schemes. But because, quite to the contrary, the common goal of developing countries is to make *all* energy cheaper, any joint commitments strategy must seek to rapidly lower the costs of renewable energy, so that renewables becomes the natural choice for developed and developing countries alike.

Luckily, this is doable; and the formula for success is quite a simple one. We need to use environmental investment as a driver.

A reasonable starting point would be forming a global partnership for setting common, international targets for the price of renewable energy. For example, deciding that costs should drop to one USD per Watt of renewable energy investment. That is on a level with the current cost of coal in China, but is much lower than what are presently the investment costs of green energy. Remember, once that cost gap is eliminated, renewables will become affordable and we will have solved much of the climate problem, as well as the development challenge.

What would be the elements of a successful partnership of the kind I just outlined, a partnership between the rich and the poor countries of the world, a 'Marshall plan' for climate and development? We think there are three key criteria: there should be common and shared goals to which all parties can subscribe; results should be clear and demonstrable; and the partnership should be time-bound.

All of these points stand out in contrast to the current state of negotiations on climate. First, most actors still view climate and development as separate or even contrasting agendas. We believe this to be a false dichotomy. They can and indeed must be brought together in order to create a joint agenda to which all nations can subscribe. Second, more often than not, the relationships between inputs and outputs in the mechanisms being proposed within the UN framework are vague, and there are real concerns from the part of developed countries that some of these mechanisms essentially amount to putting funds into a kind of 'black hole', with end results unknown.

And finally, results are open-ended. There is no end in sight to the commitments made under the UN negotiations. At what date will it be possible for developed countries to withdraw once more their public funding of mitigation projects in developing countries? When will solving the climate issues become a self-sustaining process? No one can say.

Our approach, then, has been to present concrete proposals that move beyond all three of these limitations, that combine the climate and development agendas into a framework of partnership and shared goals. One such proposal concerns the creation of a global feed-in tariff program for renewable energy.

There is a lot of detail on this, but I will try to be brief. Feed-in tariff programs have been used in some fifty countries around the world, including Germany and Spain, with very favourable results. The policy itself is very simple. It is a guarantee that the output from all new renewable energy projects will be fed into the grid; and what is more, producers are assured that the price at which they sell their energy will be consistent with making a profit. The price is preset.

This is how it works. Suppose a private company plans to set up a solar power plant in India. The price they need to receive in order to make a profit is twelve cents per kWh. However, the Indian government sells electricity to its citizens at only four cents per kWh. Paying the remaining eight cents is what the feed-in tariff is all about. Unfortunately, the financial resources possessed by the government of India and other developing countries are not unlimited; and so, in order not to exceed the state budget, the government may choose to limit the scale of the feed-in tariff so that only a few new solar plants will get built every year.

Of course, the cost of producing renewable energy is generally declining over time, and nowhere is this decline

"Up-front, front-loaded investment with strong public support will be necessary."
Tariq Banuri

as marked as in the wind and solar energy sectors. However, it is clear that in the immediate future feed-in tariffs will require subsidies so that the end price faced by consumers will still be affordable. Thus, the capacity of developing countries for implementing large-scale feed-in tariff systems will be constrained by the amounts that states can afford. What is then the best way of accelerating the deployment of renewable energy in developing countries?

We believe that a global feed-in tariff program, which supplements the policies of governments, may well be the answer. The global scale of the program is necessary because cost reductions are related to scale expansion: accelerating industry growth means costs will decline more rapidly. So if we wish to eliminate the price disadvantage of renewable energy as quickly as possible, we need to boost demand all over the world.

What are the advantages of a global feed-in tariff system? We believe that it meets all three of the criteria which I previously described. First, the goals are common and shared. Everyone believes that renewable energy is necessary; it addresses economic and human development goals as well as climate objectives. Also, the feed-in tariff subsidy will only pay incremental costs, which are well known. And the reduction in the unit cost of energy helps the North as well as the South, because green alternatives for replacing obsolete power plants in developed countries will be cheaper.

Second, the results are demonstrable. It is a system which relies on so-called output-based funding. This is not about simply throwing money at developing country governments that may or may not be corrupt; this is about funding specific projects. And if the project is unsuccessful so that the energy is not forthcoming, there will be no financial compensation. What a feed-in tariff rewards is actual results on the ground.

Third, this is a time-bound commitment. The production costs of renewable energy will be coming down, while at the same time, ever-increasing access to affordable energy means that the incomes of households in developing countries will be rising. Thus, the amount of funding needed for the subsidy will decrease from below as well as from above. Depending of how rapidly scales are ramped up, within a span of ten to twenty years, the subsidy will disappear altogether. The only question is how quickly we wish to make this transformation happen.

The feed-in tariff then provides support for poor consumers and low-carbon technologies alike. The same incentives are given to all industries; therefore, it will be those low-carbon technologies that have the best cost structure that will become dominant in the end.

In conclusion: up-front, front-loaded investment with strong public support will be necessary. There are of course other important elements that I will not cover in detail at this time: improving energy efficiency, transferring knowledge, and building new national institutions appropriate for implementing the relevant policies. However, the bottom line is that we believe that contributions of 100 billion USD annually over the period 2010-2020, channelled through existing energy systems on the basis of output delivered, will be enough to bring about the transition to low-carbon societies and to lower the costs of renewables to the point where subsidies are no longer needed.

My message to the policy makers and citizens of the world is this. On the targets for emissions reductions, let the debate continue. But here are concrete programs addressing issues where everyone agrees and where the goals are shared. Let us then find a way of making them happen; let us bring about the transition to clean energy that everyone is now seeking. If we can expand the scale of renewable energy and lower the costs, we will have solved the problem; and we will have done so regardless of whether or not we agree on national targets. Ladies and gentlemen, if we can only summon the will to action, here is how it can be done.

Clarifying questions

Question. Anders Wijkman. Thank you for an excellent

presentation. I recall that in 1992, Brazil had a proposal for quite a similar funding mechanism to help invest in green technology. It was dismissed by the elder George Bush, but just imagine what might have happened if things had turned out differently.

Now for the question. You say that you want an across-the-board kind of feed-in tariff, so that the most cost-effective or cheapest energy sources will become predominant. I am not certain that this is the correct approach. I fear that investing too heavily in what is today the least expensive renewable energy sources may have the adverse effect of delaying breakthroughs in other areas. For instance, I do not think that investments in concentrated solar power technologies, which has such an immense potential, would be forthcoming under an across-the-board system. I imagine you would need to differentiate between technologies.

Answer. Tariq Banuri. The system is based on calculating what prices would make different technologies profitable, as well as the learning curves[2] of the various industries. This means that the absolute price level that is guaranteed by the feed-in tariff is not the same for all technologies. Moreover, within this system it would be possible for policy makers to prioritise among technologies, favouring especially promising energy sources.

Question. Svante Axelsson. A short question: who will pay for the grid?

Answer. Tariq Banuri. Of course, the process of investment will in itself take time, and the shift to renewables will in some sense be a gradual one. The major issue is to plan for the transformation itself; unless there are also plans to increase renewable energy generation, expanding the grid will be much more difficult.

Now, when the costs of delivering energy are calculated within the feed-in tariff system, there are in fact two components: not only generation, but transmission and distribution as well. For instance, in Europe, where in many cases energy systems are old, around three cents of the cost is due to energy generation, while six or seven cents is for transmission and distribution. In developing countries, the transmission and distribution component is generally cheaper, around two or three cents, because energy generation tends to be concentrated in a few areas.

We believe that these grids need to expand in the future, and so the feed-in tariff is based on calculating total costs, including the costs of grid expansion. Because of the grid issue, the one dollar per Watt figure, which corresponds to a cost of two to three cents per kWh, means that the price per kWh *delivered* will be higher, perhaps around five cents.

Ola Alterå
Comments on the report and reflections on cost-effectiveness.

It is a privilege to be State Secretary of Enterprise, Energy and Communications at this pivotal moment in history, where there are overwhelming threats but also, I agree, many opportunities, not least for development.

I also had the privilege of representing European youth organisations in the process leading up to the Rio Conference in 1992; an experience which had a significant impact on the direction of my subsequent political career and on my present focus on energy issues.

The WESS report certainly raises many interesting points; I will only select a few which I feel are especially important to our discussion. First of all, I agree that it is

2. A learning curve shows how the costs for a technology will shrink as one learns how to make it more efficient and more effectively, thus driving down the costs per kilowatt-hour: the more renewable energy we produce, the more we learn about how to do it, and the less expensive it becomes.

"I think that if taxing carbon emissions proves unfeasible at the global scale, at least gradually phasing out subsidies for fossil fuels ought to be an alternative."

Ola Alterå

crucial to supplement the 'cost-sharing' approach with a development perspective. We are trying to bring this into the broader European debate by making the theme of 'eco-efficient economies' central to the Swedish EU presidency leading up to the Copenhagen conference.

In part, this agenda addresses the very same points brought forward by Svante Axelsson; that this issue is not just a matter of short-term economic cost-effectiveness, but one of active industrial policy and of long-term change to a more eco-efficient path. In addition, it is not just about climate; it concerns water resources, biodiversity, ecosystems. The bottom line is, we need to do more with less; welfare must increase at the same time as impacts on natural systems, as well as the use of limited resources, decrease.

To me personally, the greatest source for hope for the future lies is in the fact that the tragedy of climate change has finally made it obvious, beyond any doubt, that there is no future but our common future. Certainly, climate change is not the only urgent threat facing humanity, but the way in which it has brought that insight home is unique. We need to do this together.

The development agenda, of course, is central. The development that we have witnessed has been remarkable, with billions of people actually rising out of poverty. Yet another billion people are still left outside of the process. And if the convergence to a global welfare society is to continue, it has been estimated that the size of the global economy will need to increase by four or five times until 2050. At the same time, the world's population will grow from six billion up to nine billion people. Any way you look at it, that equation just does not add up. That is why, again, we will need to use what we have in a much more efficient manner.

I am sure, also, that bringing affordable energy to the world's poor will help to slow population growth. Millions of African women need to walk many miles just to acquire woodfuel; if cheap and modern energy could allow them to participate in the economy to a much larger degree and to receive more education, it would certainly affect birth rates.

On the feed-in tariff idea and the remarks about cost-effectiveness, I have the following comments. As Mr. Banuri pointed out, given the difference in objectives between developed and developing countries, it is difficult to pursue a global agenda, but I believe we need a three-fold approach.

The first part concerns putting a price on carbon. Despite what has been said about investment, still I think this is crucial. There is potential for investment in some areas, yes. But if there is no market; if it is not profitable for the private sector to take the energy shift on, in the worst case this will become just another failed industrial development policy rusting away in developing countries. Thus, we need to price emissions.

Also, it is the Swedish experience that long-term, stable CO_2 taxes are very efficient. Of course, the circumstances in developing countries are radically different. Still, I think that if taxing carbon emissions proves unfeasible at the global scale, at least gradually phasing out subsidies for fossil fuels ought to be an alternative. That needs to be done in developing countries as well; at the very least, I think that it is a strategy that should be put on the table.

The EU Emission Trading Scheme has a lot of shortcomings, certainly. Still, I think it is one of the major social innovations of our time; it is the first example of at least a regional approach to a global problem. Twenty-seven countries have agreed to pricing carbon emissions and to common targets. Also, the architecture of the scheme itself will no doubt improve over time.

The second component is technology development and investment. From listening to the debate, one could get the idea that Swedish climate policy is all about CDM and offsetting domestic emissions through flexible mechanisms. Indeed, one third of the Swedish 40 percent target will be reached through mitigation abroad. I noted that the report did not deliver any serious criticism of the flexible

mechanisms; however, I agree that they need to be improved. Still, let us not forget that the other two thirds will be done within Sweden. There are very specific instruments for making this happen: taxes, standards, and so on. We will reach that target, I am sure.

But in addition to all of this, we have the development of new technology. We are spending billions of Swedish kronor on changing the direction of the Swedish automotive industry from gas-guzzlers to fuel-efficient cars such as hybrids, electric vehicles, cars run on efficient biofuels, and so on. We have started a bilateral cooperation with China on sustainable city building, and with Brazil on efficient biofuels. There have been interesting discussions with Brazil on the possibility for third party cooperation with African countries for producing, if not actually truly sustainable, then at least the *most* sustainable biofuels possible in the world. I believe that these projects would present important opportunities for Africa to take part in the global economy.

Third and finally, institutional barriers, which goes for developed and developing countries alike. All the way from helping small cutting-edge businesses in Sweden to decreasing their energy consumption to introducing more efficient stoves for families in Eastern Africa, changing institutional frameworks and attitudes towards structural change will be a necessity.

All in all, the second of the two kinds of cost-efficiency that Svante Axelsson described in his presentation is very much present in the policy of the Swedish government, and we are trying actively to bring it into the broader European discussion on climate change.

Finally, about the proposal for a global feed-in tariff, reading the overview of the WESS report I noted that the feed-in tariff idea did not have a dominating position; there were roughly ten other suggestions that where also mentioned as important. I think this is a good thing. As we have heard, feed-in tariffs have their virtues, and going forward could play a constructive role as one solution to the climate issue. During the presentation there were a few points regarding the development agenda that were new to me, that struck me, and I will bring them with me.

However, in Sweden we use the different system of green certificates, similar to mechanisms in the proposed US Kerry-Boxer bill; these have other virtues that I feel will become increasingly obvious over the coming decade. I suspect that green certificates would not work in developing countries, as it requires a mature electricity market. Still, creating a global feed-in tariff? Even instituting a common system between Sweden and Norway can prove a staggering challenge; and those are neighboring countries. Not to mention the difficulties of coordinating the, after all relatively simple, policy of putting a price on carbon between the twenty-seven member states of the EU.

And now, if I have understood correctly, Mr. Banuri proposes a global system of feed-in tariffs for electricity, even with all the technological and administrative complexities that these entail. I am afraid that in practice, taking such a comprehensive approach from day one would mean that no progress would be made at all in many areas. Still, feed-in tariffs could undoubtedly prove important instruments for developing countries in cooperation with developed countries; maybe also for regional approaches.

Some contradictions of the global feed-in tariff system have already been brought up. We have already heard about the level playing field for different technologies. Also, on-grid and off-grid electricity should be treated alike; but if it is off-grid, say, in the countryside of Tanzania, how can you even measure the amount of energy produced? I think this proposal adds so many issues and unanswered questions, it becomes even more complicated than what is already on the negotiating table. It is an interesting idea which is not without merit, and I think it deserves to be brought up and possibly even used; but certainly not in the first phase of a global agreement, as it needlessly complicate things even further.

On cost-effectiveness, one should bear in mind that when Nicholas Stern and others argue that acting on climate change will not cost more than one or two percent of GDP,

"Globally, climate policy will succeed or fail based on one very simple thing: whether or not we can reduce the price of climate-friendly alternatives in developing countries. If we cannot reduce those prices, no matter what we do, climate policy will fail. "

Tariq Banuri

they do so based on an assumption of cost-effectiveness. That is, if we are not cost-effective, it will be much more costly to deliver the emission cuts we need.

And even if all of us in this room and in government stood up for the long-term version of cost-effectiveness, what help would it be? It would mean only losing the next election; no democracy will be able to deliver that agenda in its pure form. Thus, we need to respect the idea of short-term cost-effectiveness as well. In the real world, we will have to use taxation, trading, and offsets in developing countries while at the same time keeping long-term objectives in mind. We must maintain both perspectives.

It is only too easy to identify investment as the lowest common denominator and then to push for that. But the issue of who will pay remains unresolved; and so, we are back at the very same debates that are already taking place.

There are some shortcomings in the EU position, granted. However, the hundred billion euros that the EU has been discussing is much more when expressed in dollars. Forty percent of that figure is set to be taken from auctioning of emission credits; and what is that, if not public spending? Also, an additional twenty to forty percent, of which the EU is prepared to take its fair share, will be raised from other public sources in developed countries. It is not really fair to say that this is only one tenth of what is needed.

One might always argue that our positions are inadequate, that we offer too little. But as the chair nation of the EU, when at the G20 meetings even putting these kinds of figures on the table is rejected, sometimes I think we are being too hard on ourselves. On the global scene, we often struggle for support. The recent financial crisis has not helped either; especially when it comes to the capacity of the US for spending, given the serious budget problems they are facing.

Tariq Banuri. Response to Ola Alterå. When someone disagrees with me, I always say that it is only a matter of time. I have two points in response to Mr. Alterå. One is that we do understand that carbon pricing is central to the approaches of industrialised countries. I would, however, like to put to Ola Alterå that globally, climate policy will succeed or fail based on one very simple thing: whether or not we can reduce the price of climate-friendly alternatives in developing countries. If we cannot reduce those prices, no matter what we do, climate policy will fail.

When developed countries implement schemes for carbon pricing, it is usually combined with various income transfers designed to protect low-income households from the impacts of the tax. But in developing countries, as well as internationally, having that kind of cushioning will be much less feasible. This is one of the reasons why we think that an investment-based approach is the right one. Raise the price in developed countries, by all means; but make sure to also use an investment program for developing countries as a supplement.

The second point is that fifty countries, including developing countries, already has a feed-in tariff policy in place. It is incorrect to say that this mechanism is unproven and that it remains just an interesting idea for the future. Also, regarding the claim that it implies a great deal of complexity: absolutely not. The only information that is needed is data on the domestic industry structure, and on the international pricing profile of renewable energy. The domestic structure is in most cases quite well known, and in fact most countries have used the same pricing profile when designing domestic feed-in tariff schedules. To say that there is complexity does not respect experience from existing feed-in tariff systems.

I would ask those present to give this proposal a more sympathetic hearing; it could well prove the main solution to this problem. Only if we have a concrete and solid program in place will transforming the energy systems of developing countries be possible. Given a sympathetic hearing, I am sure that over time our views will converge.

Ola Alterå. If it is only a matter of time before we agree, in this particular instance I think that the timespan proved short indeed; I agree to essentially all of the points made. Most of all, I concur that lowering the costs of renewable energy is vital.

I am well aware of the advantages of feed-in tariffs; after all, several of our neighbours use them to great effect, though occasionally also at great cost. My point was not that feed-in tariffs do not work; I was merely expressing concern about constructing such a system at the global scale. The fact that feed-in tariffs may be used as an instrument to boost competitiveness may prove problematic, and overall it seems to me there would be a number of similar complicating factors if the system was global. In my mind I had already given this idea quite a sympathetic hearing, and I certainly think that it should be further discussed.

Eva Alfredsson
Comments on the report and reflections on cost-effectiveness

I am very happy to have been reading the WESS report. I and a colleague of mine made an analysis one and a half years ago in which we came to very similar conclusions; indeed, these are conclusions that have been reached by researchers all over the world. It is good to see such a constructive and knowledge-based global approach to climate change.

Further development without sustainability is not possible. Thus, massive investment is needed, and it is needed all over the world: this is a development challenge not only for developing countries, but for developed countries as well.

I would, however, go even further than the report in my conclusions; for instance, it does not reject the use of CDM and other offsets, towards which we are very critical and which we regard as extremely marginal solutions. In comparison, feed-in tariffs are much more promising.

Some parts of the report are also misleading in that they maintain the false idea of large differences in energy efficiencies between countries. Moreover, this report readily accepts the concept of technology transfer, which I believe is not an accurate way to describe what is needed. The truth is that we need to implement existing energy efficient and low carbon technologies and solutions everywhere: not just in developing countries, but in developed countries as well. But the funds for such investment is available only in developed countries, and so they will need to invest in transforming both their own energy and transportation sectors and those of developing countries.

Our starting point in reaching these conclusions was a critical analysis of the ideas, and perhaps even foregone conclusions, on which climate policy is often based. For example, within Swedish policy debate climate change has been discussed as if there was an environmental Kuznets curve for carbon emissions. That is, as if there was a parabolic relationship between income and emissions: as incomes rise emissions would also initially rise, then peak, and finally begin to fall back. Many pollutants have exhibited this kind of pattern; yet carbon dioxide has not.

Thus, the Swedish discussion has been premised on us being at the high-income, low-emissions end of a Kuznets curve. And indeed, our emissions have been reduced, but due to conditions which are not easily replicated elsewhere. Generally, developed countries do not have low emissions, but high. Again, there is no Kuznets curve.

And as a result, there is nothing, at least not yet, on the other side of the hypothetical 'tunnel' below the parabolic Kuznets line, the shortcut to low-carbon energy systems that developed countries were supposed to open up for developing countries. There simply are no developed, low-carbon societies anywhere in the world.

Rather, the true shape of the relationship between income and emissions is linear. When incomes increase as a result of standard economic growth policy, the unequivocal result is increased emissions. Thus, this is a challenge for every nation in the world, for low and high income countries alike.

However, the linear correlation between incomes and emissions is only a historical relationship; there is no reason to assume that it will be impossible to change for the future. Indeed, it must be changed.

If we imagine that the linear relationship is a plotted line, no country will of course have incomes and emissions that place it exactly on that line: there will be national differences in efficiencies. Some countries will have lower emissions than expected based on their income; the emissions of others will be higher. Many of the countries that might serve as positive examples are quite small, however, such as Sweden and Iceland; and due to the banking crisis, Iceland quite recently dropped like a stone back towards the plotted line. Clearly, it is the overall unsustainable linear relationship which must be changed.

The WESS report uses GDP figures that are purchasing power parity (PPP)-adjusted, which is of course quite correct as it is standard practice in economics. Without PPP-adjustments, making comparisons between countries would be of little use. However, the Swedish debate has been confused by misleading calculations that were not based on PPP-adjustments, making it appear like rich countries are much more carbon efficient than poor countries. But in fact, what the linear relationship between income and emissions tells us is that overall, there are no differences in efficiencies between rich and poor countries.

The differences that exist, in the shape of individual nations deviating from the overall relationship, are mostly due to differences in the mix of energy resources used. Some countries, for instance, use higher-quality fuels that cause less emissions; however, the total amount of fossil fuels does not change. The implication is that if one country for instance starts using cleaner coal, it only means that dirty coal will be used by another: this is a zero-sum game across time and regions.

The reason, then, that I am sceptical to the concept of technology transfer is that technologies are actually the same worldwide. We drive the same kind of cars, we fly the same airplanes, and data shows, for instance, that Chinese steel factories are neither more nor less efficient than similar plants in Sweden or the US. The factories that the Chinese build are state-of-the-art, just as in developed countries, and it is those same factories that are responsible for the increasing Chinese emissions. Technology is global.

What we need is to change those technologies, to focus on global implementation of CO_2-efficient solutions. There are a number of possible policies for making this happen; however, what policies that are appropriate crucially depend on assumptions regarding the income-emissions relationship. If we assume a Kuznets curve for carbon, then obviously as a result climate policy will be all about evening out differences in efficiency; using trade and flexible mechanisms such as CDM to make sure that developing countries become just as efficient as developed countries.

However, as we saw, that assumption would in fact be false, as the true relationship is linear. As a result, the correct policy is different: given a linear relationship, the focus needs to be on massive investment for implementing existing, but currently costly, solutions. We need to do so even if for the foreseeable future these may be quite expensive. Over time, of course, mass production may imply that economies of scale are attained and that prices drop; at the same time, we should keep in mind that increases in scale have a tendency to impact negatively on the environment, and of course lead to increasing emissions.

In addition, we need a number of command-and-control measures. Because some available technologies are or may be harmful, some government regulation is called for. Also, taxes will be necessary; however, these should mostly be used for generating funds for investment, rather than driving change in developing countries. A feed-in tariff system, we feel, would fit nicely into all of this.

Now, as we know, time is short; the energy transformation in essence needs to be completed by 2050. This means that we do not have the luxury of going slowly, trying out the relative strengths and weaknesses of different technologies,

"Although the traditional economic growth agenda forms the basis of modern society as we know it, it has not been to the benefit of all; and looking to the future, it is clear that it is not sustainable. It must be modernised to correct for these flaws."

Eva Alfredsson

proceeding one step at a time. Implementation needs to happen in parallel instead of in sequence; everything we have should be rolled out at the same time, starting immediately.

There can be no doubt concerning the scale of the challenge. Assuming that energy use grows by 1.5 percent per year in the future, by 2050 we will need 36 000 TWh, which is nearly twice the amount that we use today. Of that, 30 000 TWhs should be CO_2-free in order to reach stated targets on climate change. In comparison, one nuclear power plant produces approximately five TWhs. In fact, no one technology will be able to overcome this challenge.

There are of course some promising signs that things are moving in the right direction. For more than a decade, global annual installed wind capacity has consistently seen exponential increase, and in 2007 reached 20 GWs per year. But again, compared to the enormity of the challenge, where we are currently at is still very far from where we need to go. According to one scenario, in just over a decade the 20 GW figure needs to increase to around 150 GWs per year, and stay there until the year 2050.

Similarly, it has been estimated that the EU regulations setting automobile emissions to 120 grams CO_2 per kilometre will not lead to an absolute decrease in emissions, but only to decreasing the increase of those emissions from forty to thirty percent. That is a step forward, of course, but we clearly cannot expect it to be enough. Likewise, simulating what it would take to reduce emissions from the transport sector by 20 % up to 2020, we found that the following was needed.

First, by 2012 we need regulations capping automobile emissions at 70 grams of CO_2 emissions per kilometre. Second, the fuel efficiency of trucks needs to be improved by 10 percent. And third, *half* of all transport of people and goods needs to be shifted to environmentally superior alternatives such as cycling, public transport, and trains. Remember, that is for a 20 percent reduction until 2020, which in the long run is only the beginning.

One might ask: if the transport sector is not prepared to deliver any cuts at all, then where is there potential for the huge cuts that are actually needed? We can no longer afford to regard each sector separately; we must look at the overall picture.

Certainly, there exist solutions and ways forward; but unless, as has been noted, we adopt some sort of Marshall plan, we will fail. Analysis of the Swedish certificate system supports the argument that focusing on technology neutrality and short-term cost-effectiveness leads to sequential, rather than parallel implementation of solutions while also tending to discourage much-needed innovation and the development of new technologies. We should seek bolder approaches, even if it means making mistakes in the process; we have no choice.

Although I am by no means an expert on feed-in tariffs, from the little I have read about them, I feel that they could prove a very important instrument. Their capacity to introduce new technologies has been shown empirically in Germany and elsewhere.

In conclusion, although the traditional economic growth agenda forms the basis of modern society as we know it, it has not been to the benefit of all; and looking to the future, it is clear that it is not sustainable. It must be modernised to correct for these flaws.

That transition will not happen by itself. Large amounts of resources, as well as a professional approach based on very clear-cut and coherent goals, will be crucial. Results will need to be evaluated quite frequently as we go along: for instance, because of the so-called rebound effect improvements in energy efficiency has so far not reduced energy use. Taking a wider perspective is vital if we wish to avoid for instance reducing emissions from individual cars while overall emissions from transport keep rising. And finally, while pushing ahead with all of these policies, let us make sure also to conduct research and make long-term plans for achieving sustainable development.

"Many people of the South actually have a better perspective on what the climate problem is and what can be done to solve it."

Larry Lohmann

Larry Lohmann
Comments on the report and reflections on cost-effectiveness

Although I have not yet had the opportunity to examine the WESS report in all its detail, I cannot stress enough how refreshing it is to finally encounter a document which actually confronts many of the central political, technical, and investment issues for dealing with climate change.

So many things in this report are welcome: the stress on front-loaded investment; the recognition of the fact that we need to start at a scale far beyond what the market-based approaches that have dominated the debate so far are capable of delivering; the point that private investment needs to be given clear direction in order to be successful; and of course, the suggestion of a global feed-in tariff, which I think is a very constructive and interesting proposal.

It is interesting to note that many of the points made by the report are shared by popular movements calling for climate justice. One example is of course the need for massive investment and transfers from North to South, separate from and additional to the usual foreign aid framework. However, there are also some questions that I imagine might be raised by climate justice movements towards a report such as this.

I too attended the Bangkok meeting, though unlike Niclas Hällström, I spent most of my time outside of the conference hall, and thus was able to escape the pervasive doubt, horror, and despair of the official negotiations. Instead, I participated in a number of popular movement events surrounding the meeting.

One thing in particular stands out in my mind as I look back: a protest of thousands of people marching through the streets of Bangkok, including outside the United Nations. I think it is fair to say that part of what the protesters were calling for was in line with the basic thrust of the report, namely the need to get off fossil fuels. Affordable energy; respect for the needs of the South; a moratorium on new coal-fired power plants; an end to oil drilling; also, an end to nuclear; these were a few of the strong demands made. And these protesters were not only Thai, but people all over South East Asia and beyond. I do not think that anyone in that march would have contested the right to affordable electricity and the centrality of such issues to the entire climate debate.

At the same time, I also noted that the protesters were also calling attention to many other things. No more hydroelectric dams: that was one strong element in the protest. Wind power was not very prominent as a theme; however, I know that many of the protesters were concerned with large-scale wind power projects usurping land across the global South; taking over pastures, closing commons, and so forth.

Thus, one question that might be raised is probably this: how can those demands and perspectives be brought together with the somewhat traditional and developmentalist perspective which is reflected in the report? For instance, the idea that somehow biomass is less efficient than electricity. Generally, I think there are many nuances that should be openly acknowledged when discussing these issues, and to such a debate the perspectives of popular movements could contribute greatly.

The other point which probably the protesters I spoke with would have stressed concerns the necessity of transfers from the South to the North. I am not referring to finance, of course, but to transfers of knowledge and proper understanding of the climate problem which the North often lacks. Many people of the South actually have a better perspective on what the climate problem is and what can be done to solve it. In particular, there is a need for transfers of Southern technologies and institutions which are appropriate for dealing with the climate problem.

This perspective could perhaps usefully supplement the largely traditional, Northern-dominated, developmentalist perspective which shines through somewhat in the WESS report. Certainly, the whole idea of technology transfer, as Eva Alfredsson pointed out, needs to be more thoroughly

interrogated, as well as the assumption that the North is somehow the locus of efficiency, whereas in fact it is the South which has been most energy efficient over the last 150 years.

A few more overlapping questions might be raised. How does the emphasis on growth in the report – I believe the phrase was 'catch-up growth' – square up to the fact that historically, growth has neither led to convergence nor served the interests of the poor? How will the growth advocated in the report avoid that reality?

Also, how might the feed-in tariff proposal be further developed in order to support, and be supported by, climate justice movements? I have already indicated some points of overlap, but I think that in subsequent discussions more attention needs to be placed on the institutional structures for financial and technical decision making. Meaning: who is actually going to decide which technologies benefit from the feed-in tariffs? What about large hydroelectric dams, large-scale windfarms, massive solar arrays in the desert; will they be supported?

One last question. As probably one of the few US citizens present, I find it interesting that both the Marshall Plan and the New Deal are brought up as role models. As you know, both of these were US initiatives, so perhaps it is then my responsibility as a US citizen to provide some critical discussion of what they actually accomplished.

While being aware of the benefits brought on by the New Deal and the Marshall Plan, we likewise need to be aware that both initiatives were undertaken in the context of not only trying to pre-empt, but in fact also to suppress democratic movements of liberation both within and outside the borders of the United States. If we are unwilling to accept the political package that came with those reforms, we need to be careful with such analogies.

Finally, I wish to make a few critical remarks about the fetish of cost-effectiveness which has dominated the climate debate so far. There may be some overlap with previous speakers; indeed, like Svante Axelsson I find it important to examine different kinds of cost-effectiveness. In particular, what kind of cost-effectiveness will the carbon markets supposedly deliver, and is that really the kind that is needed?

The carbon markets are in fact constructed in a way that creates a steady movement away from actually dealing with the climate problem. That problem, which I think the report emphasises both indirectly and directly, concerns shifting the economy away from the historical pathway of fossil fuel use. But as soon as we let ourselves be dominated by the problem of finding a way to deal with climate change cost-effectively and within a market context, we start to lose touch with the basic problem and instead are mired in technical discussions on numerical short-term targets and the technicalities of imposing an emissions cap.

One might think this would be the same thing as solving the actual problem; it is not. A cap which is quantifiable and can be chopped up into allowances is needed for starting up a market operation where emissions can be traded around for efficiencies. But people involved in the carbon markets do not even discuss fossil fuels. Their concern is rather issues like technology neutrality; it might as well be fossil fuel neutrality.

The trading is where the cost-effectiveness is supposedly achieved. Once the equivalence of all or most emissions sources is established, transforming carbon into a common currency, all issues of technology, history, and place are conveniently made abstract. Then perhaps, some efficiencies will be attained; but considering that this approach means losing touch with the underlying historical problem of climate and fossil fuels, what is the point?

In the extreme case offsets are introduced, meaning that emissions reductions are made equivalent to everything under the sun, from ocean fertilisation to not riding an elevator. Then, the scope for efficiencies is huge; and of course, there will be no effect whatsoever on climate change.

My final remark is that the whole premise of cost-effectiveness is based on a flawed understanding of the climate science. The Harvard economist Martin Weitzman argued in a recent paper that it would be dangerously

"The very quest for cost-effectiveness actually reduces the chance that our actions will be cost-effective in the long term."

Larry Lohmann

misleading to disregard the incredible magnitude of the deep structural uncertainties that are involved in climate-change analysis by presenting a cost-benefit estimate for a situation with potentially unlimited downside exposure as if it is accurate and objective.

That is, because of the uncertainty with regard to the risks and effects of the nonlinear impacts known as 'tipping points', it is false to assume that some economically optimal, climatically 'safe' level of greenhouse gas concentrations or global temperatures could even be calculated, much less follow like clockwork from progressively reducing a cap on emissions.

In summary, trying to achieve cost-effectiveness through trade becomes incoherent insofar as creating the market framework necessary to make sense of the idea of cost-effectiveness entails losing touch with what is supposedly being costed. Hence, the very quest for cost-effectiveness actually reduces the chance that our actions will be cost-effective in the long term. This is a strange paradox, but a powerful one.

The cost-effectiveness ideology assumes that finding a historical trajectory away from fossil fuels is simply a question of finding the right short-term price for the carbon commodity. That amounts to treating a *Tyrannosaurus rex* as if it were a little kitten. But of course, it should be recognized that the entire agenda of short-term cost-effectiveness is partly based on the idea that it will, or should, be possible to cash in on carbon. This incentive is very real; and we should all be careful not to allow it to dominate scientifically informed discussions on climate change.

Panel conversation and interaction with the audience

Remark. Svante Axelsson. Having spoken again with Ola Alterå in the coffee break, I feel that I should clarify some points about the 100 billion euro figure. Forty percent of that sum is money for offsets; this essentially means funding for the emissions reductions of developed countries, albeit reductions carried out in developing countries. Thus, these forty percent are in fact not additional. Another forty percent are 'low-hanging fruits', cheap projects that are in fact paid by developing countries themselves; yet for some reason the EU has chosen to include that figure in its own package. And so, what is left in terms of actual EU commitments for action in developing countries, is the 2-15 billion euro figure.

At least, this was the bottom line of the communication from the European Commission which was published some weeks ago. Most likely, however, that document will form the basis for the overall EU negotiating position on finance over the coming weeks and months.

I also have one more reflection on the feed-in tariff. It struck me that this approach is quite similar to the agricultural policies of Sweden and the EU. As we know, subsidies have been extremely effective – indeed, one might argue they have been only too effective – in boosting the domestic production of agricultural products. This is then yet another area where guaranteeing high prices for producers and low prices for consumers has proved a successful policy; although in this particular case the policies in question have outlived their use and ought to be scaled back. My point is that it works.

Finally, I should point out that in Eva Alfredsson's presentation there was no mention of the fact that Sweden has shown that it is possible to decouple GNP and emissions growth through strong climate policy. Swedish CO_2 taxes have proved quite successful, allowing us to increase GNP while decreasing emissions. I am sure it would be a powerful combination if revenues from such a carbon tax could be redirected into an investment program. Putting the polluter pays principle at the centre of climate policy implies taxing emissions. Still, carbon taxes are much less feasible in poor countries; that is why feed-in tariffs are such attractive alternatives for developing countries.

Question. Alan Atkisson, AtKisson Group. I would like the panel to comment on the present state of the world's dialogue on the issue of growth. We have just had the Stiglitz Commission present its report on rethinking economic indicators, and despite the remarks made by Larry Lohmann, I think few people here would dispute that the developing world needs continued growth in the number of schools as well as other kinds of infrastructure. Still, we need to be able to respond to the likely criticisms of the climate justice movement about promoting a traditional growth agenda.

Generally, there is a tendency to confuse growth in the purely monetary sense with the kind of growth that actually reflects creating more of the things we truly need. In the wake of the financial crisis there were signs of some serious re-evaluation taking place, and the Stiglitz Commission was timely in that sense. But now that dialogue seems to be fading once more into the mist, and I wonder if an opportunity has been missed. That is why I am curious to hear the views of the panel on how the climate problem stacks up to the dialogue on what growth means.

Answer. Eva Alfredsson. This is in fact exactly the kind of issues I was referring to when I mentioned the need to move in parallel, with strong investment in the short to medium term as well as longer term reconsideration and restructuring of the entire economic system. Still, even garnering support for clean energy investments may often prove enough of a challenge. Although it needs to be done, I am afraid that also calling for rebuilding the economic system from the ground up may prove one provocation too many. We should certainly investigate and research the possibilities of moving away from the unsustainable and unequal present growth model, though.

" The institutions that have clustered around the ideology of economic growth for at least the last fifty to seventy years need to be critically examined as part of any attempt to deal with climate change."

Larry Lohmann

Answer. Tariq Banuri. This question is quite interesting; so fascinating, in fact, that in order for us not to entirely get caught up in it, perhaps it would be best left for another time. I will say this, though. In this century, paradoxically it may turn out that climate change is the easiest of the problems that we will face. Humanity is already hitting against many planetary boundaries, and fast approaching others. At least with climate change, there is a technological solution: once fossil fuels are replaced with renewable energy, it would in fact be possible to grow for quite a long time even within the existing growth model.

However, the other planetary limits do not come with easy solutions, and we will need to adapt our lifestyles, our political structures and the very way we think about growth to live in a steady-state economic system. That challenge is much more complex than the one we face today, though if we manage to solve the climate problem collectively we will at least be left with many tools at our disposal for dealing with the real sustainability problems.

What the WESS report does is only to propose solutions for the after all rather concrete problems of climate change and development. The longer term issues are waiting at the door, at we will need to address them eventually; but I suppose I have to leave something for my daughter to do when she grows up as well!

Answer. Svante Axelsson. The distinction between the short and the long run is useful in this case. In the short run, we need to make the point that ambitious climate policy and growth are not conflicting goals. Again, Sweden is a good example of this. Likewise, the large-scale clean energy investment needed will in fact boost growth rates worldwide. Thus, calling for an end to growth is not constructive, because changing the energy system will in itself generate GNP growth. In the long run, however, I do believe that further economic growth will become an impossibility.

In fact, the entire debate is somewhat confused, because obviously growth for growth's sake is meaningless. After all, the point of growth is supposed to be that overall welfare increases: but is it not then in fact welfare, and not growth, that should be discussed? We need to start by asking the right questions.

Answer. Larry Lohmann. When it comes to the growth issue, I confess myself slightly more pessimistic than both Tariq Banuri and Svante Axelsson. The historical record is that the emphasis on economic growth has resulted in wider gaps between rich and poor; it has made the poor poorer, it has destroyed certain kinds of knowledge as well as certain possibilities for sustainability. The high-flown debate about the nature of growth, the ideological purposes of how growth is defined and how those definitions could revised; these issues are not very interesting to me. To some extent, they are simply a matter of semantics.

On the other hand, the institutions that have clustered around the ideology of economic growth for at least the last fifty to seventy years need to be critically examined as part of any attempt to deal with climate change. In fact, if those institutions and their politics are not addressed, we are not going to be able to deal with the problem; or rather, those issues are the climate problem. Indeed, this is not a new problem, but one that has been with us for a long time. It centres on issues of distribution, of struggles, of the dominance of fossil fuels, all of which are of a political nature. If we are to deal with the climate problem, these issues must be put front and centre.

Question. Per Bolund, Member of Parliament for the Swedish Green Party. First of all, I very much agree that a global feed-in tariff system would prove quite efficient. However, I fail to see that it would intrinsically be able to reduce emissions unless it were combined with some mechanism for pricing fossil fuels out of the market. Are there any comments on this?

Also, one implication of the EU communication that was mentioned earlier is actually that countries in the global

South will be forced to start trading in carbon in order to be granted a share of EU funds. At the same time, we know that the EU Emission Trading Scheme (ETS) was extremely ineffective in its first period, and its second-period performance has so far also not been impressive.

In theory, carbon trading is cost-effective and thus very attractive; but in reality it has not yet proved capable of reducing emissions at a sufficiently rapid pace. My second question is this: can the ETS be saved through reform, or would it be better to start again with some other instrument, such as carbon taxes?

Answer. Tariq Banuri. In the Brundtland Commission Report of 1987, *Our Common Future*, there is a passage which argues that although it is not possible to state exactly at what point human society will start hitting against the environmental boundaries of the planet, boundaries there are; and before we reach them, we will need to have achieved equitable access to natural resources. The reason is that once there is equity, the prospects for effective cooperation against common threats increases.

This insight is central to our work. We seek to bring about a transition which will at least mean equitable access to the energy services that are of such crucial importance to the climate issue. Raising the cost of carbon, whether through a carbon tax or through carbon trading, will not be enough simply because it works only by excluding those who cannot afford to pay. This is one important similarity between carbon taxes and cap-and-trade.

In some sense, carbon is life. It is almost as if overnight, water had been scarce. Would any civilised country then consider it a decent solution to tax drinking water, including that of poor people? No; pricing can only be acceptable if you start from a relatively equitable income distribution.

In conclusion, for us at the WESS, imposing a global price on carbon is a viable alternative only at the end of a long process making energy more generally available worldwide. However, we do believe that the industrialised countries are at the stage where taxes or carbon trading could be utilised, ineffective as it might be.

Apart from the similarity I just mentioned, there is an important difference between taxes and trading schemes, as Larry Lohmann pointed out. To the extent that a very elaborate pricing system obscures reality, it is a serious problem; the financial crisis clearly demonstrated the dangers of having large amounts of resources channelled into an unstable sector of the economy. As a result taxes, as is also believed by many economists, may be preferable to carbon trading.

Answer. Larry Lohmann. I agree; pricing carbon through a tax would have a use, but only at the end of a process involving many other things, such as investment in alternatives to fossil fuels. I should add, however, that there are some additional problems with any carbon trading system involving offsets, and especially with a global carbon market.

Carbon trading will interfere with technical progress on climate change, however one defines that. It gives incentives for delay and actively discourages shifting to a different technological path. Not only does it not support climate-friendly technologies, it actively interferes with the preservation or development of existing low-carbon technologies such as, for example, sustainable irrigation systems in the global South which have been continually improved upon for generations. These long-term experiments in low-carbon ways of life, if you will, are now being actively destroyed by the carbon markets.

Answer. Eva Alfredsson. Like Tariq Banuri, we made the analogy that imposing a global tax on carbon is like pricing air or water. One reason why we are very critical to the CDM is the fact that poor countries do not have any offsets to sell, as they will basically need all their emissions allocations for themselves. They will need to keep increasing their emissions for some time. The only way around that paradox is, once again, heavy investment.

Still, we argue that carbon taxes do have a part to play, if only in raising funds for investment. Because of the PPP-adjustment issue, though, we do not think that carbon trading will work; in fact, it is wildly inappropriate for the task at hand. At least the magnitude of a carbon tax can be adjusted to local circumstances. Cap-and-trade only benefits countries with high price levels.

I think that some consensus along these very lines has begun to emerge among most researchers that have devoted serious study to these issues. The main obstacle is that conventional wisdom among policy makers is still very much one of single-mindedly promoting industry competitiveness, making a profit off carbon trading, and so on.

In addition, policy needs much more to get actively involved. For a long time, policy makers have been content to take a step back and let the market sort things out; but this crisis is one that markets have proved unable to solve. Policy makers need to step back into the breach and take the lead in designing appropriate incentive structures, regulations and investment policies to deal with climate change.

Answer. Svante Axelsson. My view is that rather than being an economic or a technical problem, at its heart climate change is a distributional problem. That is why a feed-in tariff is so important: it helps to resolve the distributional issues, because it does not rely on having poor countries adopt the carbon pricing approach which in any case only the rich countries can really afford to implement.

But even within Sweden and other developed countries, we need to pay attention to distributional issues. How will policy makers manage to radically increase the prices of electricity and gasoline without losing the support of the electorate?

According to most economists, in theory taxes are the best solution because of low 'transaction costs'. However, the argument is that taxes are difficult to implement, which means that cap-and-trade works as a second-best alternative. I disagree that carbon trading is ineffective; it does work, but only if the cap is sufficiently low. And this has so far not been the case with the ETS. It is quite possible for an instrument to work perfectly in theory, but be riddled with problems because it has not been correctly or ambitiously implemented.

For instance, even Swedish Prime Minister Fredrik Reinfeldt agrees that carbon taxes are the most effective way of pricing carbon. But how much is he willing to raise those taxes? If the answer is no more than a few öre[3], no wonder his policies have little effect. The instruments themselves are only as effective as our targets allow them to be. The real issue, regardless of whether we are discussing taxes or cap-and-trade, concerns how to create broad support for higher electricity and gasoline prices. Personally, I do not doubt that this challenge could be overcome.

As I see it, the main problem with cap-and-trade is the offsets market. This is a purely political construction with no theoretical arguments to back it up. Instead using sectorial carbon trading would make a superior approach, I think, such as creating a global carbon market only for energy intensive industries. Imposing an international carbon tax upon those sectors would in any case prove very difficult. The sectorial cap-and-trade system could then be combined with international carbon taxes for other sectors of the economy.

Remark. Tariq Banuri. I wish to repeat the general point I made earlier: carbon really is life. We are made of carbon; we consume carbon; and we excrete carbon. We have done it for millennia. But it is a closed loop. The thing that changed with the Industrial Revolution is that we started digging carbon out of the ground and burning it. Now some little part of that carbon ended up in the atmosphere, and it is going to kill us.

But the closed loop of carbon is really what life is about: it is like water. We have a tendency to miss this difference. Poor people's consumption of carbon is still a closed loop,

"The thing is to build confidence that the money put in, […], is actually put to good use "
Tariq Banuri

by and large. It is really the extra amount that we are emitting which causes the problem.

Question. Barbara Evaeus, WWF. I personally find many of the things that I have heard here today very appealing, especially the concept of benefit sharing as opposed to burden sharing, and the proposal for a global feed-in tariff. At the same time, being somewhat of a veteran in all of this, I cannot help but feel somewhat pessimistic, and I am still worried about the financial aspects. The words 'global carbon tax' are still taboo to many people, and the meagre funds offered up by the EU are outright scandalous. So how can we actually make this happen?

Furthermore, the concept of linking climate and development, thus hitting two birds with one stone, as it were, is very appealing. But then, is there not a risk that funds that should be dedicated to traditional development aid are instead diverted to climate aid? Or, although we may not wish to admit it, could it be that this risk actually proves to be a benefit in the end? Perhaps it would be correct to view developmental gains as a kind of 'bonus' to dealing with the climate issue?

Answer. Tariq Banuri. Will the dollars be there? Of course, we cannot say. Our analysis is simply that the likelihood of the mechanism being well funded is at least much improved, if what is on the table are concrete programs with end results that are likewise concrete and transparent. The thing is to build confidence that the money put in, no matter the ultimate size of those amounts, is actually put to good use in making energy investment happen and in protecting global public goods.

Now, will the funds be additional? Again, we do not know; but as the words 'new and additional' are consistently used, one assumes that this will be the case.

I always think of a development analyst as someone who believes that the development problem is temporary; that we will solve it, and that in one or two generations there will be no inequalities between countries of the type that exist today. For renewable energy in particular, we think that a short-term injection of funds as a way of getting over the hump is both possible and desirable. Instead of another poverty trap lasting for a hundred years, let us imagine a ten-year program; and when it ends, we will have solved these problems. That is the idea which I think needs to go to taxpayers and negotiators alike.

Answer. Svante Axelsson. Although the finance issue is of course a major obstacle, I do think that the feed-in tariff concept is a good one. It helps to make headway on three problems at the same time: the climate crisis, the economic crisis of developed countries, and the poverty crisis of developing countries. There are simply not enough resources for tackling each of these problems separately. We need an integrated approach.

Still, we should face up to the fact that consumer patterns will in fact need to change: generating funds for investment means increasing the tax burden on households, and it may also prove necessary to redirect funds from military budgets and other parts of public spending. Again, one way to do so would be through a tax on aviation and shipping. Changing consumer patterns will generate GNP growth; but of a different kind than what we have witnessed so far.

Question. Lovisa Hagberg, WWF. I understand that one of the advantages of the feed-in tariffs would be that similar policies are already in place in many countries. However, I wonder if there is a need for new institutions, or could the feed-in tariffs fit into the existing global system of governance?

Also, I have a question about land-use change, which is another important and very tricky component of the climate

3. One Swedish Krona is 100 öre.

issue. Larry Lohmann has mentioned some of the many challenges in this area; for example, how to reduce deforestation while taking into account different localities, social systems et cetera. In this context, would the feed-in tariffs imply some kind of criteria for ascertaining the sustainability of projects; or is it assumed that this would cause the system to bog down in excessive detail and bureaucracy?

Answer. Tariq Banuri. Certainly, there are some areas where additional criteria would need to be developed: forests, biofuels, hydroelectric power, and more. For instance, the guidelines of the World Commission on Dams have been consistently ignored. But if there is at least a framework for starting up activities in areas where good guidelines are already in place, other things can be added as we proceed.

Answer. Larry Lohmann. Let us not forget that the basic problem concerns fossil fuels. When it comes to land-use change, there is a temptation to assume that dealing with land use is the same as dealing with fossil fuels, because it both cases emissions could be reduced. But it is not. Many farmers and forest dwellers in the South recognise this and consequently oppose schemes designed to incorporate for instance forest conservation into climate investment plans or carbon markets.

Question. Anders Friström, Sveriges Natur Magazine. A question for Mr. Tariq Banuri. You argued that the feed-in tariff system must be of a global scale in order to work properly. But in practice, how global would it really be? I understand that a global financial framework is necessary, but still, would this system not in large part need to be run nationally? In my mind, the potentially largest weakness of your proposal is that it requires building up the institutional competence of national electricity utilities, which in many cases is sorely lacking. Can they actually handle such a system?

Answer. Tariq Banuri. Clearly, every idea does need some institutions. Still, our view is that overall, the feed-in tariff is really institutionally light. It is true that institutional capacities vary across countries, however implementation of the global feed-in tariff system will most likely begin in areas where institutions are already well developed, countries that have already started to invest in renewable energy.

Our understanding is that there are national institutions capable of rising to the task, and in any case that the global feed-in tariffs should only form a supplement to what national governments are already doing. National institutions would need to be supported and strengthened, yes; but crucially, it would be in the own interest of governments to link those institutions to a global program.

Regarding what specific institutional shape the system might take, again, there are several possibilities. It could be placed directly under the UN Climate Convention, or it could perhaps form part of the International Renewable Energy Agency; I basically have no view on this. I will simply stress an institutionally light, output-based approach as appropriate.

Answer. Eva Alfredsson. We need to focus on getting the resources for making this happen; my view is that institutional issues are secondary. We also need to realise that there is no role model in this case. Sweden may be the world leader in reducing emissions while improving welfare, but that feat is due to nuclear, hydro power, and biomass, all of which are policies will not be easily copied by other countries.

Again, we need to invent a new development path. Because technology is global, other countries will follow once we manage to construct an advanced energy system where per capita emissions, which is the most relevant metric, are low. The problem is the pace at which we will need to proceed. But first, find real solutions that work; then focus on designing institutions for putting them into place across the world.

" But first, find real solutions that work; then focus on designing institutions for putting them into place across the world. "

Eva Alfredsson

Remark. Larry Lohmann. I find that much of today's seminar has stressed listening to people in the global South concerning where and how investments need to be made in order to solve the climate problem as well as the challenges of what has been referred to as development.

On the other hand, it is always a good thing to allow for some nuances and to ask ourselves: when we listen to voices from the South, which groups do these voices actually speak for? Everyone would perhaps agree that investments in affordable renewable energy are important, but to a large degree, it is actually the elites of the South that are most strongly making this demand. While important, there are other also voices that one should pay attention to.

What I have noticed about some of these other groups – activists, NGOs, ordinary villagers – is that when one asks them what they think about climate change and investment, often their first priority is not in fact massive transfers of energy investment from North to South.

They might agree with that to some extent, of course. But what they really want is for investment to happen here, in the North, to make sure we get off fossil fuels as soon as possible. That way, not only would they benefit directly from the action taken, but they would also face less risk from the kinds of impacts that tend to result when there is massive North-to-South investment and 'transfer of technologies'. In addition, they would face less risk of having their struggles against their own elites undermined.

These voices also need to be heard and heeded; although our goals of eliminating the inequalities between the North and the South are justifiable, we need to be very careful about which groups in the South we choose to listen to.

Participants

Eva Alfredsson

works as a senior analyst at the Swedish agency for growth policy analysis where she is responsible for analyses within the area of sustainable economic growth and development. Recent work include the much debated *How to reach both climate policy goals and good economic growth*, and a study on the service sector which explains the 'service sector paradox' i.e. why a transition towards a service economy have not reduced material flows.

Ola Alterå

is State Secretary at the Ministry of Enterprise, Energy and Communications in Sweden. His background includes studies in Engineering Physics at Chalmers University of Technology. As Secretary General for the Centre Party, Mr Alterå initiated a reform process in terms of politics and organisation. In order to put into practice one of his core interests, Renewable Energy, he then moved on to a position as the Managing Director of the Swedish District Heating Association. Since 2006, he holds the position as State Secretary with responsibility for Energy, State Ownership Policy, Primary Industries and Sustainable Development.

Svante Axelsson

has been Director of the SSNC since 2000, having previously worked at the Swedish Society for Nature Conservation (Naturskyddsföreningen) as environmental economist and as head of the Environment Department. Svante Axelsson developed environmental economics as a subject at the Swedish University of Agricultural Sciences, 1988-1993, and he has been a pioneer in developing ideas around a tax shift from labour to environmentally damaging activities in the economy. His work at the SSNC covers a broad range of environmental issues, but has a strong focus on climate change.

Tariq Banuri

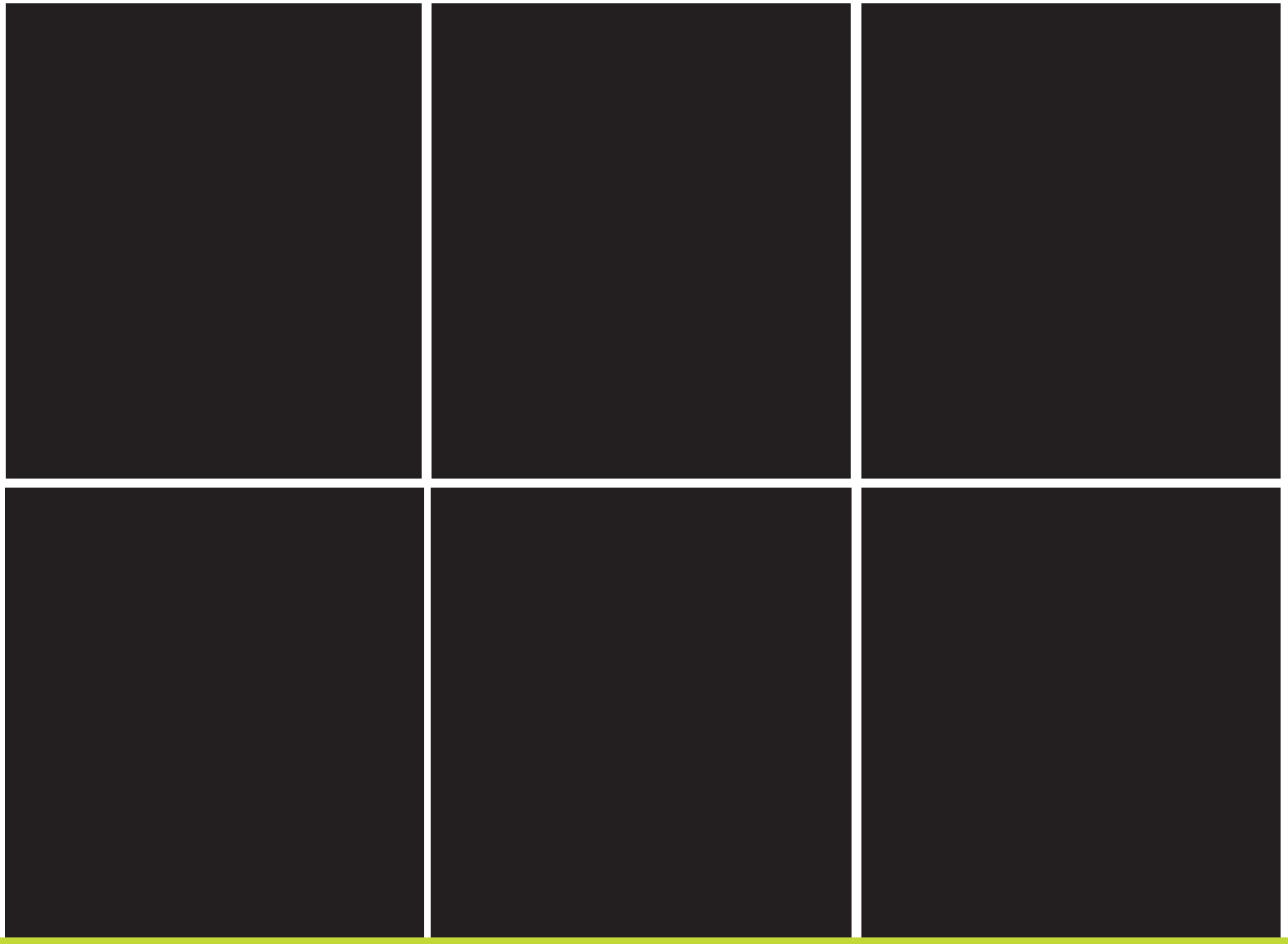
is Director for the UN Division for Sustainable Development. Prior to taking up the UN position he worked with the Stockholm Environment Institute where he headed the Asia office, and later became Senior Fellow and head of the Future Sustainability Program. Banuri has extensive experience from the interface between policy, research and practical work on sustainable development and the integration of climate change and development. He has played an important role within the IPCC, where he coordinated the chapter on sustainable development in the third assessment report and contributed to the chapter on equity and social justice in the second report. He did his PhD in economnics at Harvard University and founded and directed a policy think tank on sustainable development in Pakistan prior to joining SEI.

Larry Lohmann

works with the Corner House, a small research and solidarity organisation in the UK. He has worked on a broad range of issues, including climate change, racism, forest conflicts, development and the politics of cost-benefit analysis. In recent years he has focused much of his work on climate change and critical analysis of carbon trading. He was the lead author and editor of the Dag Hammarskjöld Foundation publication *Carbon Trading: A critical conversation on climate change, power and privatisation*, which has been downloaded in more than 500 000 copies. He is currently examining the potential impact of carbon trading on the financial markets and new speculative bubbles.

Moderator
Niclas Hällström

works as expert on climate at the SSNC International Department, focusing on policy issues connected to climate and development. Before joining SSNC in 2008 he worked with the Dag Hammarskjöld Foundation for many years, and, before that, was part of creating the Centre for Environment and Development Studies (Cemus) in Uppsala, where he still teaches. He is presently setting up an independent initiative – "What Next?" – in parallel to the work on climate.



Seminar report from Seminar no. 6:
Technology and climate: curse or promise?

In a world that must move towards more or less completely fossil free energy, production and transportation systems within just a few decades, the choice of technologies is at the core – both in rich and poor countries. How can we ensure that technologies contribute to real solutions, and not a worsening of the many crises – climate, food, environment, health – we now see converging? Are we on our way to 'solve' the climate crisis by creating, through new technologies, global problems that may be as problematic as climate change itself?

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues6

Participants: Johan Lilliestam, Potsdam Institute for Climate Impact Research, Sverker Molander, Chalmers University of Technology, Pat Mooney, ETC Group, Michael Rantil, Ministry of the Environment, Eva Selin Lindgren, Member of the Swedish Parliament

Moderator and project coordinator: Niclas Hällström, SSNC Summary by: Claes Ek The seminar took place: 20 October 2009, Kulturhuset, Stockholm Layout: Espmark & Espmark Printing: Stockholm December 2009
www.naturskyddsforeningen.se/keyissues

Produced with financial support from Sida. Sida did not participate in the production of this publication and holds no position on the opinions contained therein.

Technology and climate: curse or promise?

Niclas Hällström
Introduction

At the SSNC we recognise that the key issues that have been discussed over the course of this seminar series are very difficult and lack easy answers. In fact, the SSNC has hardly any outspoken position on most of them, and part of the reason why we organise these seminars is to facilitate the development of positions and policies within our own organisation. Pooling together diverse experiences from the North and the South in an open conversation that captures all the nuances and avoids polarised debate seems to be the best way to do so.

Not the least, this is the case when it comes to issues of technology, which is today's overriding theme. Technology is at the core of the UN negotiations on climate, forming one of the four 'pillars' being discussed under the Long-term Cooperative Action (LCA) track of the UN process. It is generally recognised as being central.

At the same time, in the negotiations there is very little critical discussion on technologies. The general view rather seems to be that 'the more the better': ensuring that as much technology as possible is transferred from the North to the South in order to a enable low-carbon development in poor and middle-income countries. Further analysis is rare.

This is not good enough. We need to be more nuanced; not all technologies are necessarily beneficial, and we need to ensure that only the good ones are actually transferred. In solving the climate problem, we need to take care so that we do not create new problems, even global problems rivalling the threat of climate change itself.

How then to do so? What are reasonable approaches to precaution and assessment of technologies? Also, what are the real opportunities being opened up by new technologies, and how do we best realise them? In this context, is technology transfer really an unproblematic concept? Finally, throughout all of this, we should be aware that technologies are always part of cultures, societies, and overall social contexts.

However, we begin with a warning from Pat Mooney on what may await us in the not-too-distant future: large-scale 'geoengineering' techno-fixes that appear to be increasingly gaining traction within the negotiations and in these days of climate panic. A recent report by Pat's ETC Group, commissioned by the SSNC, provides technical and political background on the entire concept of geoengineering, and will eventually be published as part of a range of materials coming out of the 'Key Issues' seminar series.

Pat Mooney
Geo-engineering – is gambling with Earth the way to tackle climate change?

While perhaps in the panel discussions at the end of this seminar we will have the chance to also discuss more broadly other kinds of technologies, for now I will focus on what the world is calling 'geoengineering'. My fervent hope is that this is something which, after today, you will never hear about again; and certainly not in Copenhagen.

Geoengineering is the idea that it would be possible to somehow engineer the planet out of the climate crisis; that what James Lovelock calls 'Gaia' can be manipulated to serve our needs. There are a number of strange ideas being put forward: adjusting the surface of the ocean or the stratosphere, creating plantations of trees, and so on. Some people believe that projects such as these may be able to reduce the temperatures of the planet either directly, or indirectly through sucking up carbon dioxide from the atmosphere.

Even mentioning these ideas, I get the feeling that probably half of the audience will be looking for the doorway, thinking that even to imagine that we could change the planet in such a way is sheer madness and hubris. And I wish they were right, but as much as I hope that my topic will disappear from the face of the earth, I am afraid that the direction in which we are moving is the opposite.

"My fervent hope is that this is something which, after today, you will never hear about again; and certainly not in Copenhagen."
Pat Mooney

I think we all accept that Copenhagen will not be a great success; far from it. And I am afraid that in the months following Copenhagen governments will increasingly find themselves in the position – and business will find themselves faced with the opportunity – where geoengineering on a large scale will appear as a kind of 'Plan B': an option which they cannot avoid. They will feel the need to start looking at it. I would argue that even thinking about it puts us all on a slippery slope and that, once we start moving in that direction, these kinds of massive experiments at adjusting the world for us will be all but inevitable.

There are in fact two things that I find very worrying. The first is then the very notion that it would be possible to change the planet in order to sidestep the realities of climate change. While that prospect seems fearful enough, I am just as frightened by the kind of people who think geoengineering is possible and would be willing to perform it.

Now, geoengineering has got quite a long history. When I attended a meeting in Rome a few days ago, someone joked that there is geoengineering in the Bible. Moses parting the Red Sea, the great flood; after all, what are these other than geoengineering at its most effective? Seriously though, that is perhaps going back too far.

A more recent historical example of geoengineering is when Leonardo da Vinci teamed up with Niccolò Machiavelli to change the course of the Arno river and thus to deprive another city state of its water supply. This is not fiction; it actually happened. But the project also failed. In the end, da Vinci was forced to flee to Milan, while Machiavelli ended up in jail and subequently authored The Prince. The failure was really one of corruption rather than engineering; still, this incident serves as an early example of carrying out major changes to the environment in order to meet political needs.

In a more modern sense, it could be argued that geoengineering goes back to the 1960s and to US president Lyndon Johnson, who in 1965 was briefed on climate change by his Science Advisory Committee. The general thrust was that climate change is real, it is starting to happen, and it will need to be dealt with. However, the advice presented to President Johnson was not to reduce energy consumption, change the lifestyles of Americans, or any of the other logical things that we would now have been grateful for, had they happened at that early stage. Instead, the message was that we could use science and technology to solve the problem by changing the planet.

Because Johnson was a great lover of new technologies, that idea was met with great approval; and incidentally, it did not take long until President Johnson had the opportunity to try it out. At around the same time, the Bihar Famine of 1966-1967 was unfolding in India, and with the permission of the Indian government Johnson initiated a confidential, multi-million-dollar project designed to create rain across the drought-stricken province.

It failed; but we may be unsurprised to learn that geoengineering was then picked up by the next US president, Richard Nixon. The Bihar failure, it was apparently felt, was not enough cause to discount such technologies entirely. And so, it was tried again, this time in Vietnam. 'Operation Popeye', as it became known, was an attempt to flood the Ho Chi Minh trail through cloud seeding; it lasted for more than five years.

In the end, it is still inconclusive whether the increased rainfall over those areas were in fact due to US interference, or if it was a natural phenomenon. The proof of principle that it could actually be done was never really firmly established.

However, what had been established was the idea that governments should be able to carry out projects like these. So much so, in fact, that by 1978, after the end of the Vietnam War, the US and the Soviet Union put forward a joint treaty proposal to the UN General Assembly calling for an end to using the environment, or geoengineering, as a method of war. This so-called Environmental Modification Treaty was signed by all of the world's major powers, and it is also one of the last international treaties that the United States ever signed.

The fact that this is the case is important because as we know, in the discussions around Copenhagen geoengineering is now once more gaining support among governments. There is a debate among lawyers whether the Environmental Modification Treaty actually legally prohibits countries from geoengineering the climate.

Many governments have in fact been involved in researching, testing, and even applying various geo-engineering techniques in recent decades. For example, China has undertaken weather modification projects, most famously in preventing rainfall at the 2008 Beijing Olympics and at the 60th anniversary of the Communist Party. Admittedly, these have been on a relatively small scale.

On the other hand, according to the World Meteorological Organisation every year an average of fifty countries are involved with some kind of weather modification experiment. These are countries from all parts of the world, including developing countries such as Thailand, South Africa, and Mexico. At one point, ten percent of the US aerospace industry was engaged in either trying to cause or to prevent rainfall. Even today, the reports keep coming in; yet whether or not these projects are successful is never really clear.

Most existing weather modification methods, then, are related to rainfall. But around the year 1990, there began to appear other suggestions, concerning climate change specifically. This was when the idea really began to emerge that we need to deal with greenhouse gases through some 'quick-fix' adjustment of the atmosphere. A multitude of scientific proposals were made, many of which were supported by the US government.

For instance, Edward Teller, who had close ties to the US administration and was probably one of the most influential scientists of the twentieth century within the United States, produced a series of papers around this time urging the US government to take on geoengineering as a solution to climate change.

Teller argued, and I believe he does have a point in this, that it is indeed possible in principle to geoengineer the planet into a different climate. There is in fact no doubt about this; the proof that it can be done is there. Indeed, this is why global warming exists; albeit inadvertently, we have already geoengineered the planet into a crisis.

Now, Teller's argument was that if we geoengineered ourselves into this crisis, then should we not also be able to geoengineer ourselves out of it? But somewhere along the way, I think, the logic of this argument falls apart. After all, can we really trust the very same people who got us all into this mess to also get us out of it? I doubt it.

I remember reading some of those geoengineering proposals at the time, and I recall just how outlandish they seemed; not just to me, but to the entire environmental community as well as to all serious policy makers. They were dismissed across the board. The overall impression was that these schemes were bordering on the outright insane and neither would nor should ever be carried out.

The proposals were things like creating a new nutrient base in the oceans and thus allow for a phytoplankton bloom which might draw carbon dioxide from the atmosphere; and when the plankton died, they would sink to the bottom of the ocean and sequester the carbon for centuries, if not forever. Also, argued the proponents, there would be additional benefits through increased fish stocks.

The only thing necessary to cause this effect, it was claimed, would be to spread enough urea or iron particles on the ocean surface in areas where there is a deficit of such nutrients. However, scientists looked at these claims in the late 1980s and early 1990s, and most concluded that the risks and dangers of ocean fertilisation far outweighed any potential benefits.

Another fanciful notion was to create a kind of 'space umbrella'. Once constructed, this was supposed to be blasted, say, 1.5 million kilometres into space and then positioned in such a way as to block about ten percent of the sunlight reaching the Earth, reducing surface temperatures by perhaps one or two degrees. Even in the 1980s, this seemed extremely expensive, not to mention completely senseless and impractical.

In addition, some people were apparently inspired by the 1991 volcanic eruption in the Philippines. Major eruptions release into the atmosphere large amounts of particles which block a portion of the sunlight and lower global temperatures for a few years. Thus, the suggestion was that it might be possible to continually simulate a volcanic eruption by artificially injecting sulphate particles into the stratosphere, for instance by means of some sort of cannon.

The idea was that not only would temperatures then drop, but sea level rise would slow, and even the release of methane from the tundra would be affected: a kind of win-win situation, unless of course you happened to live near the volcano. But again, during the 1990s these ideas were examined in detail, and most people concluded that it would be incredibly expensive, fraught with all kinds of uncertainty, and in other words plain silly.

Other suggestions seemed to be a bit more reasonable. For example, some were calling for planting large numbers of trees in order to soak up more carbon dioxide, and then throwing the wood into the ocean to keep the CO_2 from returning to the atmosphere. Others were thinking about manipulating soils for sequestering more carbon dioxide.

All of these ideas were out there, some crazier than others, all of them seeming incredibly expensive and requiring manipulation of vast parts of the Earth's atmosphere, oceans, or land. By and large, I think most people believed they were dismissed at the time. But they were not; not entirely.

When my organisation, the ETC Group, started looking into geoengineering in early 2007 I came across a couple of stories about ocean fertilisation: the idea I mentioned earlier about creating phytoplankton blooms. I was surprised to find, when meeting with a few Canadian government officials, that Canada had in fact been involved in such an experiment. The Canadian navy had gone out around Vancouver Island off the west coast and dumped iron into the ocean. It had been a failure. I asked them what had happened. It sank, they answered. One feels it hardly takes a sharp scientist to figure that one out.

Still, I asked if that meant the idea had been abandoned. But according to the Deputy Minister of the Environment, who was the one telling me this story, quite to the contrary the idea been taken up by the Japanese, the Americans, the Norwegians, and others. In fact, when I studied this more closely I found that at that point there had been eleven different international experiments to fertilise the oceans. Some had involved only very small patches of ocean, like fifty square kilometres or so; others had been on a much larger scale, covering several thousand square kilometres.

The experiments had taken place all over the world, including in the Arctic, the Antarctic, and the Gulf of Mexico. One experiment was even near the Galápagos Islands; someone must have felt that if you are going to be interfering with pristine environments, you might as well go all the way with it! And most experiments had involved a whole series of governments.

To the best of my knowledge, Sweden was not involved in any of them; but the UK was, as was Norway, Japan, Russia, South Africa, Mexico, Chile, India; Germany was heavily involved, and the US participated in the majority of experiments. From the 1990s onwards, all of these governments have been involved in ocean fertilisation. After one failed experiment, one scientist from a major US oceanographic institute announced that if he had half a tanker of iron, he could create a new ice age. As if that was supposed to be a good thing. Another experiment led by the US had taken place in the Southern Ocean and had been aborted for fear of inadvertently sterilising half of the Pacific. I am glad they stopped; now, why did they even try it in the first place?

Thus, even as most people thought that geoengineering had been dismissed and was not going to happen, these experiments were carrying on. The idea had not been abandoned; governments were doing active research. And governments cannot be trusted to behave intelligently even in the best of times; certainly not in a crisis such as climate change. At the ETC Group, we came to the point where we felt we had to intervene at the international level, to get the

"[…] we succeeded in getting what he described as a de facto moratorium against ocean fertilisation. All of the 191 countries that have signed on to the Convention agreed to it."

Pat Mooney

idea that the planet can be geoengineered off the table.

In May, 2008 we took the issue of ocean fertilisation to a meeting on the Convention on Biological Diversity in Bonn, Germany. As a civil society organisation we felt that this was our best opportunity, because ocean fertilisation was still seen as being on the fringe, and governments were not talking openly about their experiments.

The plan was then to move in quickly to get a resolution adopted without, so to speak, anyone looking: without industry being aware of what was happening. An additional advantage with the Convention on Biological Diversity was that the US has never signed it; as a result, they do not really have a say in the proceedings. And in the end, with a great deal of help from the German Minister of Environment, we succeeded in getting what he described as a de facto moratorium against ocean fertilisation. All of the 191 countries that have signed on to the Convention agreed to it.

The point that we were making is that given the risks, large-scale or even middle-scale experiments with ocean fertilisation is unacceptable. Scientific research on a very small scale is fine, as long as it takes place within coastal waters; dumping things on the open sea is not.

Our sense of urgency in getting the moratorium came from the fact that there were already two companies accepting money for carbon credits based on things they promised to do to the surface of the ocean. One company named Planktos were planning to sail to the Humboldt Current, near the Galápagos Islands, on what they were calling, paralleling Darwin's exploits, a 'Voyage of Recovery'. The stated objective was to save the fish stocks, save the oceans and the planet itself from global warming. Their method for doing so: dump iron particles into an area of ten thousand square kilometres.

There was no scientific logic to the claims they were making. In fact, apart from the odd quack, we could not find any scientists backing their ideas. But most importantly, what we could not find was any kind of regulations that would prevent Planktos from carrying out their plan in those international waters.

We then approached the London Convention on Ocean Dumping, and persuaded them to issue a damning statement on the activities of Planktos. But seeing as even this did not shut the planned operation down, we finally got the Ecuadorian government to step in. They were rather aggressive about the whole affair; in fact, they offered to sink their ship.

Perhaps after careful review of their insurance policy, Planktos then prudently decided against going to the Galápagos Islands and instead headed for another area which was in the Atlantic. But in the end, because of the debate sparked by their venture the company went bankrupt and their ship drifted around on the ocean for several months – no port would actually let them dock. Planktos finally had to sell off the ship and close down operations.

That was just before the debates under the Convention on Biological Diversity. But the idea of geoengineering is apparently very resilient. Even though we now have a moratorium on ocean fertilisation, governments have neither stopped researching nor discussing geoengineering; for instance, earlier this year, Germany and India performed a joint fertilisation experiment.

And so, we feel that if Copenhagen is a failure – and however much some actors try to paper this over, it will be a failure – governments are going to turn to geoengineering as the Plan B. They will attempt things like stratospheric injections of sulphur, the space umbrella idea, or some of the other things that have been proposed, such as constructing a fleet of five hundred robotic vessels that go back and forth across the ocean, blowing up salt spray into the sky, whitening the tops of the clouds, reflecting sunlight away from the Earth.

The cost of this last scheme is between twenty-five and fifty billion USD per year, which after all is pretty cheap compared to saving General Motors or bailing out a bank. This is what is frightening to us: geoengineering now appears

"I think Vattenfall should be ashamed of themselves, for numerous reasons. One is that CCS is not a carbon-free technology, and could never be."

Johan Lilliestam

financially much more feasible than it did back in the 1990s. The sense that governments do not possess the political will to pursue real policies or lifestyle changes with regard to climate change is so pervasive that we feel that geoengineering will be seen a substitute for addressing the real problem.

We fear that the message that governments will send to their populations is that there is no need to worry about climate change, because a technological fix exists which will allow all of us to carry on with our lives as usual. Why change our societies, when we can just change the planet instead?

Only in the last few months, there have been a number of international meetings and national studies that support this view. Reports coming from the White House, the National Academy of Sciences in the United States, and from the Royal Society in the UK have all argued that as terrible as it is to contemplate geoengineering the planet, we no longer have a choice. We have to be looking at what might be the possible Plan B. These reports all agree that geoengineering may still never be necessary, but that at the very least, we need to look at what the possibilities are.

So money is being put into geoengineering by governments, by the UK in particular; and reports are coming from major government institutions saying we have to be serious about this. I believe that following Copenhagen, governments in the North will feel like they have a green light to go ahead with experiments on geoengineering, and that in the end they will in fact make Plan B the operable plan for responding to climate change. That will be the main tendency among governments; that is the direction in which they will head.

How can we have faith in this? Even if it were theoretically possible to safely geoengineer the planet, which I doubt it is, given the incredible complexity of the environment; even then, how can we trust those who caused the problem with trying to come up with a geoengineering solution for it? Studies of the stratospheric sulphur idea have shown that even though it might mitigate some of the damage caused by climate change in the temperate zones, this benefit would come at the cost of causing famine in South Asia and Sub-Saharan Africa. Who then gets to set the thermostat; who gets to adjust the temperature?

And even within the temperate zones, if the choice is between hot days in Europe or hot days in the United States, who wins? Can we really have any faith that leaders who for decades have been climate deniers or climate change avoiders will suddenly now behave rationally and intelligently enough to use responsibly such an incredibly powerful tool as geoengineering?

Absolutely not. They cannot be trusted; they will not do it right. They may act in accordance with science, but morally they will not use it in a way that is equitable, fair and safe for the planet. Even though scientifically, one may argue that we have no choice, we must not let the politicians venture down this path.

Unlike the Kyoto agreement, where for it to work basically every major country needs to sign up on reducing emissions, geoengineering only takes one country: one superpower, or perhaps a coalition of the willing. Like with nuclear testing in the stratosphere, no international agreement is needed; they just go ahead and do it. That is what we need to stop from happening, and that is why I hope that after today, you will never hear about this ever again.

Johan Lilliestam
Technologies for 100% renewable electricity: dream or possibility?

I work at the Potsdam Institute for Climate Impact Research. As the name suggests, our focus is not mainly on climate science as such, but on evaluating the likely impacts of climate change on natural systems, social systems, and lastly political and economic systems, which is my own area of research.

Specifically, my work concerns European future electricity and energy policy. Over the course of the last four years, some major themes have emerged. We have combined

our findings into a long-term vision, one might say, for what the European electricity system might look like in 2050. We call this the 'SuperSmart Grid'.

Not only does this concept have an appealing name, it actually has concrete meaning. This is a different kind of technology from the ones presented by Pat Mooney. There is always risk, of course; but in this case, the risk is to companies like E-ON or Vattenfall, and not really to the planet itself. I will only present the broad strokes of the vision here.

First of all, the challenge. The European power sector is currently overwhelmingly reliant on coal and lignite, a state of affairs which is not compatible with avoiding the worst impacts of climate change. You are aware, of course, of the EU target of 20 percent emissions reductions by 2020; my view is that this target is quite ambitious enough, and although we will fail to meet it, it is a good target.

In the long term, we need to reduce emissions by at least 80 percent. Most people here, I guess, would argue that 80 percent is inadequate, and that we need to push for 90 or 95 percent. Still, the 80 percent figure is a kind of unofficial target found in numerous EU directives as well as in the legislations of many countries; thus, we have used it as a starting point in proposing the design for a future electricity system.

Also note that for the electricity system, whether 80 percent or some higher figure is chosen as a long-term target does not really matter. This is because the target refers to society as a whole; but there are structural constraints in many sectors that will in effect prevent them from attaining even an 80 percent reduction. This is true for the transport sector as well as for many industries. Therefore, the power sector, where 80 percent is easily possible, needs to compensate for this shortfall by being completely decarbonised by 2050.

There is really no way around this fact. It is just a question of how to make it happen. Also, consideration needs to be given to the security of supply of electricity, as well as to its cost-efficiency. Costs must be reasonable and affordable; they may be higher than at present, but not very much higher.

Clearly, the emissions target implies an end to all coal power in Europe by 2050. The question is how to replace it, and with what? In this context, three alternative energy options are often discussed.

First, there is natural gas. But this is disqualified almost immediately, because natural gas is a fossil fuel. As it is not carbon neutral, building a carbon-free electricity system based on natural gas is impossible. Natural gas also has other problems related to security of supply. Although not felt in Sweden, in countries like Hungary and Bulgaria the disadvantages of natural gas became readily apparent last winter as Russia turned of its gas deliveries to Ukraine, which is a transit country for gas pipelines to much of Europe.

Second, allegedly, there is the much-discussed Carbon Capture and Storage (CCS) technologies, where Swedish company Vattenfall is a world leader in research and development. I think Vattenfall should be ashamed of themselves, for numerous reasons. One is that CCS is not a carbon-free technology, and could never be. Even if it works, which indeed is most uncertain, CCS would only entail a 70 to 80 percent reduction in CO_2 emissions. This is good, but as I have explained, it is not good enough. In Germany, Vattenfall used to claim that CCS would be carbon free until the German Supreme Court, the Federal Court of Justice, declared this claim to be without scientific backing.

But the main weakness with CCS is that the life of coal-fired power plants is generally very long, forty years or more. In Eastern Europe, a few of the coal plants that were built as early as around 1915 are still operational. Thus, the argument that CCS could form a medium-term solution until more low-carbon alternatives are available falls apart.

Because the CCS-fitted plants that we will build in 2020 or 2025, assuming these technologies ever come online, will then remain operational until 2060 at least, at which point

we will have missed the targets. Moreover, it is only profitable to build the plants if we do not expect them to be decommissioned before their time. Thus, if we go for CCS it will not help in attaining long-term emissions targets, and may even prove detrimental.

The third option, nuclear power, is of course largely carbon neutral. However, there are numerous other problems. I will only name a few of the numerous incidents that have happened at nuclear power stations in recent years: Forsmark, Krümmel, Cadarach; the list goes on.

In one German power plant the piping of the reactor cooling system kept falling down because of faulty screws. In the French nuclear power station at Cadarach, twenty kilograms of plutonium were discovered lying around; no one had been keeping track of it. One wonders how much plutonium is unaccounted for in various nuclear plants around the world.

Even assuming that the safety problems can be brought under control, will the nuclear industry be able to compete on the market without government support? Some have suggested that new nuclear plants will be cheaper to build. However, the Finnish experience shows otherwise: the costs of the new Finnish power plant at Olkiluoto have more than doubled compared to initial estimates, soaring to over five billion Euro. Nuclear power is by far the most expensive option out there.

So then, if in reality neither natural gas nor CCS nor nuclear is an option, what is? I am, after all, not an advocate of inaction. Let us instead examine the renewable energy option. Or rather, I should say options, because there are a multitude of renewables technologies: photovoltaic solar, solar towers, parabolic trough systems, onshore and offshore wind power, biomass, biogas, large-scale and small-scale hydropower, and more.

Now, the power grid is central to completely decarbonising the European power sector using only renewable electricity. As I explained earlier, the concept we have been working with is called SuperSmart Grid; to this, there are two components: the super grid, and the smart grid. The smart grid connects industries, housing and residential areas, offices – all the customers from all sectors – with production facilities such as wind stations, cogeneration plants, and so-called virtual power plants which I will discuss in a little while.

What is more, with a smart grid all parts of the system are able to communicate. For instance, if at a given point in time there is little wind, meaning the amount of wind power electricity that is generated falls, the electricity price rises as a result. This fact is then communicated through the smart grid to all consumers, the message being that since electricity is short, they need to either cut back on it or pay more.

The smart grid means decentralised and regional electricity generation; this is more or less what renewable energy looks like today, with fairly small wind farms and solar power installations scattered across the landscape. Having every region generate its own power is a good thing, because it means having to build less transmission lines.

But most of all, the smart grid offers tools to deal with intermittency. The main problem with renewable energy is not its cost, but the problem that for instance, wind power only works when the wind blows. Of course, intermittency also implies greatly increased costs. Still, the main problem is the risk of recurring power shortages.

Now, the smart grid offers two options for dealing with intermittency. The first one is the virtual power plant concept. This is an aggregate of several power stations; it could be composed of, for instance, a wind farm, a photovoltaic solar station, a concentrated solar plant, and a biomass power plant. Having a virtual power plant means making sure that all of these four power plants deliver some predefined firm load at all times.

However, the only power station where it is possible to adjust the generation of electricity at will, is the biomass plant. The others are all constrained by the amount of wind and sunlight that is available. But if all four plants are

"The total economic potential of wind and solar energy from the Sahara is on the order of 600.000 TWhs per year. That is two hundred times the current European electricity consumption."

Johan Lilliestam

aggregated into a virtual power plant, it becomes possible to guarantee a firm load: either there is wind, or there is sunlight, or the biomass plant will provide the compensating power if there is neither. Forming one of the cornerstones of the smart grid concept, virtual power plants will play a major role in electricity generation over the next decades.

The second method for dealing with intermittencies is load management at the consumer level. Most of the electricity used by households is for activities that are not in fact bound to any particular time of day. For example, in most cases it does not really matter whether you wash your clothes at seven o'clock in the evening or at eleven o'clock. Thus, at least part of these loads could arguably be moved in accordance with electricity supply, saving peakload capacity for the grid as well as lowering electricity costs for consumers that opt to put off their washing.

Under such a decentralised smart grid, the potential for full renewable electricity generation in Europe is there, if only just; it could be done. But the real good news is related to overlaying the regional smart grids with a super grid. After all, although there is good potential for wind power in places like Great Britain or for biomass and hydro power in Finland or Sweden, the real potential for renewable electricity comes from outside of Europe: from the Sahara desert in Africa.

In the desert, there are massive solar and wind resources throughout the year; in fact, the total economic potential of wind and solar energy from the Sahara is on the order of 600.000 TWhs per year. That is two hundred times the current European electricity consumption.

What would be needed in order to tap this potential? Of course, obviously we would need to construct the power plants; that is the easy part. The major obstacles lie with the grid, because electricity will have to be transported all the way from the desert to the parts of Europe where it is needed.

Luckily, there are technologies to address this. Direct current power cables entail losses of only about three percent over one thousand kilometres at full load, compared to ten percent for alternating current lines. Also, we have been building direct current grids for more than seventy years, and the first submarine direct current power cable, connecting mainland Sweden with Gotland, went online already in 1954.

Thus, it would indeed be economically feasible to connect these extremely promising North African sites with the European electricity grid, implying two major advantages. First, let us assume that we only utilise the very best of the African sites, places where the potential for solar energy is three or four times the maximum potential in Europe and where wind potential is twice that of Europe. If then combined with renewable energy generation at the best European sites, this would lower total costs for the entire system and increase its efficiency quite radically.

The second benefit is that intermittencies would be substantially reduced. Wind power off the coast of Morocco and in Britain would be negatively correlated; in the winter, Britain sees high winds while Morocco has little wind; in the summer, the reverse is true. Over the course of an entire year, these two regions are on balance with each other, causing a smoothing effect and a much lower frequency of intermittencies.

In addition to this seasonal smoothing, there is also a daily smoothing of renewable electricity. The distance between two geographical corners of the electricity system is up to five thousand kilometres; this is twice the size of a weather system. As a result, if there is a high pressure zone in one part of the system, in another there will be low pressure: if there is wind in one region, in another there will be sunlight.

All we need to do in order to secure the electricity supply of the entire system is to have a connection in place between the places where there is wind of sunlight at the moment, to the places where there is not. In fact, if combined with other technologies these solutions to the intermittency problem can be taken even further.

"Athough African countries may produce electricity, in the countryside only a few percent have access to it, despite the fact that this is where around 90 percent of the population tends to live. "

Sverker Molander

In conclusion, by creating a super grid we can lower the cost of intermittency and enable Europe to become fully powered by renewable electricity, and all of this possibly at a cost which is even lower than the current cost of electricity.

Sverker Molander
Leapfrogging energy systems of developing countries - wishful thinking or reasonable option?

First, let me say that I am in favour of engineering; but not all of it. At the Department for Environmental Systems Analysis at Chalmers University of Technology we make assessments related to socio-technical systems and the environment. 'Socio-technical' means that we are dealing with people as well as with the technologies themselves.

My presentation is on the possibilities for leapfrogging. This is a phenomenon which is already happening all over the world. For instance, while on a visit to Africa, in the middle of the savannah I suddenly heard a familiar sound: a mobile phone was ringing. One of my Masai companions answered, speaking in a torrent of Swahili, finished the call and then promptly informed me that he had to leave shortly, as there was a rhinoceros about.

That is leapfrogging. The telephone system that exists in Sweden or in other developed countries is the result of a very long development path starting more than a hundred years ago. Our system is a combination of an old one based on telephone wires, and a newer, wireless one. But what the people in Kenya and elsewhere have done is to bypass the wire systems, instead skipping directly ahead to wireless, mobile technologies. Leapfrogging means making a sort of jump from one technology, or indeed no technology at all, to state of the art solutions. The question is if it would be possible to do the same with energy systems.

My primary focus in this presentation will be on the situation in Sub-Saharan Africa. In these countries, generally there are very large and quickly growing rural populations, which is a problem because in most cases the agricultural sector offers little in terms of livelihoods. Energy systems are mostly non-commercial, which is to say that no energy system really exists except for gathering firewood. In countries like Tanzania or Mozambique, where we are doing our case studies, this forms about 80 percent of total energy use.

Granted, across the region some energy systems, in our sense of the word, are already in place. However, in the typical case these consist of only a few massive hydroelectric power plants linked directly with the capital city. Therefore, although African countries may produce electricity, in the countryside only a few percent have access to it, despite the fact that this is where around 90 percent of the population tends to live. These parts of Africa are completely dark during night time.

Grid extension is usually not profitable and thus happens only very slowly, if at all: in these parts of the world, investments in electricity does not happen as a natural result of the internal workings of national economies. Instead, they are being driven by foreign aid organisations such as Sida, who are doing what they can. For better or worse, these countries are heavily dependent on foreign aid, which brings opportunities as well as severe problems.

Still, several countries have now launched renewable energy programs; the sector is showing some growth. Just a month ago, I visited Dar es Salaam, and I noticed several advertisements for wind power: of the type 'buy your own wind power plant'. The scale is small, but it is there.

However, with attempted leapfrogging we have seen many failures in the past, often resulting from a kind of sociotechnical mismatch. Foreign aid has tended to work by moving existing technologies from industrialised countries to the developing world.

Large-scale hydro power is a case in point. Hydroelectric power has a large share of the Swedish electricity mix, and that of Norway as well; countries that are also quite ambitious when it comes to development aid. The approach, then, has essentially been one of having our Swedish dams,

"No matter how much we negotiate at the international level, no real change will be effected in developing countries unless people on the ground understand, in relation to decisions made, what they can do and how they can benefit."

Sverker Molander

installations and all, moved down to Africa. Many have pointed out the dangers with such projects, and I believe that the Swedish Society for Nature Conservation is one of them.

This kind of technology transfer will of course bring many benefits, for some people. There is after all the thick electrical wire running to the capital city. But the problem remains that those benefits will not be distributed equally. The sociotechnical mismatch I mentioned then results from moving a technology which is working in our societies into a completely different social setting. One cannot expect it to work as it does here; likewise, one cannot just assume that transformations which took the developed world a hundred years or more to complete will be possible simply to speed up in developing countries.

There is a need in these countries for economic growth: needs related to education, health services, and so on. There are also unexploited fossil resources. However, there is one major difference between the situations in Europe and Africa. In Europe, technological systems are already in place: there is production, there is capacity. The main challenge is to change the system, to reshape it into some low carbon counterpart. But in Africa, there is no capacity; or at least, not much. In Africa the need is not for a change, but for the emergence of something new.

Again, this is what leapfrogging is about. Must poor countries develop along the same technological path that developed countries have followed? Are fossil fuels a necessary transit point along the way to renewable energy, or is it possible to go from nothing and skip right to renewables?

Now, there are many kinds of renewable energy sources. Wind and solar, of course; but also geothermal, various kinds of hydro, biomass. Another technology that may have a major part to play is ocean wave power. There are a few quite good sites for solar in Mozambique and Tanzania, but these lack the perpetually clear skies of the Sahara desert, meaning that high-efficiency, high-capacity solar installations are probably not feasible. The same goes for wind power.

However, the existence of tidal currents of a fairly large magnitude points to ocean energy as one possibility. Though at present little is known about ocean energy, I am confident it will prove an important energy source in the future; the reason being that there are no activities competing for sea areas, in sharp contrast to the biofuels case. Not only does biofuels compete with food production for agricultural land, it also threatens remaining forests which are vital for biodiversity. There is some potential for biomass, but one that must be utilised with great care.

In my view the focus for leapfrogging processes should be on productive energy systems; that is, on electrification. Much research has shown this to be an excellent option. Given the slow pace of growth of national grids, it may prove a fruitful alternative to construct smaller solitary grids overlayed by a large common grid, similar to Johan Lilliestam's argument: an energy Internet, so to speak.

We also agree that diversifying across different renewable energy sources will be necessary. In the end, what we would like is for the renewable energy sector to become self-sufficient and to provide greater returns to investment, so that growth becomes possible; because in these countries, growth is badly needed. I do not really think the same could be said of developed countries. Here, growth is more a case of adding extra fat to both people and systems; but in those very 'thin' developing economies, there is a real need for growth.

However, in order to get there, it will be crucial to achieve and sustain sufficient forward momentum. When discussing these kinds of issues, often we stop at the macro scale; indeed, one might argue even these seminars have a kind of macro thinking to them, as if that is the scale that is most important. Obviously, having good international institutions in place can be helpful; still, it should be acknowledged that any workable solution will need to function at all levels of complexity, be they macro, meso, or micro.

Accordingly, most of our research is related to the micro and meso scales. The devil is in the details, and no matter how much we negotiate at the international level, no real change will be effected in developing countries unless people on the ground understand, in relation to decisions made, what they can do and how they can benefit.

Growing concern about climate change drives interest in renewable solutions, and there may be some international instruments for economically supporting the development of renewables. However, energy systems can only prove successful if they meet local demands and the preconditions of the people. This is not often recognised. The global feed-in tariff discussed at the last seminar in the 'Key Issues' series may prove a good idea, but needs to be tailored more closely to local circumstances.

In summary, there are a number of important technical and economic prerequisites for successful leapfrogging, some of which I have already mentioned. First, an appropriate scale is necessary; indeed, much of the development failures of the last three or four decades is due to the kind of scale mismatch which I have already discussed.

A second requirement is having an infrastructure for installation and maintenance. This is also related to competence and to keeping in touch with what are the interests and capacities of people, as well as to having a spirit of cooperation in these societies. Third, electricity generation needs to be reliable. Fourth, not only must renewable energy be affordable, it also needs to be profitable in terms of money, time saved, or some other concrete benefit.

A number of the prerequisites are of an institutional nature, though in many cases little is known about them. A great many developing countries suffer from being dependent on foreign aid and will need to build up the capacities of their own institutions, including the capacity for organisation and management of renewable energy systems. Issues of political power and decision making are likewise important, as are gender issues, problems of risk and benefit sharing; and so on.

One should keep in mind that people's perception of the future will influence their actions in the present. If then people do not perceive that renewable energy would bring them direct benefits, why should they support it?

Finally, while renewable energy is currently expanding even in very poor countries, do not forget the concept of the niche market. Some people are prepared to pay quite a great deal more per kWh; for instance, for countries such as Tanzania people whose willingness to pay for energy is quite high tend to gather around the hotels along the coastline. Those areas may have quite well developed modern technologies instead of the usual diesel generators. But it is never more than a niche, which again points to the need for social embedding of new technologies in achieving broad results.

Therefore, institutional arrangements are key, because what we are discussing are in fact socio-technical systems operating within an ecological setting. I do believe leapfrogging energy systems is an option, but it is not a quick fix. Most of all, it is not a technological fix, but a sociotechnical one. Hence, our future research efforts will focus on investigating the prerequisites and consequences of leapfrogging within such a context of sociotechnical and ecological systems evaluation.

Eva Selin Lindgren

Comments and reflections: Technology assessment and precaution – how avoid false solutions?

It has been most interesting to listen to the presentations so far, and I have made a few notes in comment. There were some very important messages, such as Pat Mooney's warning on geoengineering; and I think that Michael Rantil, who represents the Minstry of Environment at this seminar, should take note of the criticisms leveled at governments. I believe these are points that need to be raised in the Swedish Parliament as well.

My personal opinion is that the way governments are acting with regard to technology is quite foolish. They are

"Recognising that CCS is still an unproven technology, we always make sure to add that what we are promoting is safe CCS."

Michael Rantil

pushing for far-reaching technological systems with no knowledge of how they work, or even of life on this Earth. We did not invent life; indeed, we are only at the end of a long line of innovations reaching back several billion years. It is time for them to change their attitude.

The way in which our voting systems function could also be questioned. On what basis are leaders actually selected; what kind of people do our systems favour? Is the system based on rhetoric or on actual policy making? After all, making a difference on the ground does not necessarily translate into democratic popularity; our systems are flawed as a result.

I do hope that Pat Mooney's insights on geoengineering will become more widely spread among governments, because they are in my opinion badly needed. I also believe that they are needed among developing country governments, because as Sverker Molander pointed out, trying to simply sell our solutions to Africa and elsewhere does not work.

People in those regions are at least as clever as we are, but little attention is paid to what solutions they have created for themselves. In many cases, the problems that they have been able to solve are ones that do not exist in our societies, which means that the solutions are easily missed by us; still, I do think that we need to keep an open mind for learning from developing countries.

In the Swedish Parliament I have also proposed that greater emphasis be placed on experience-based knowledge, because knowledge exists in your entire system; not only in the brain, but in the hands, and in the heart. But these other kinds of knowledge are often overlooked.

Speaking of knowledge and learning, I also believe in the virtue of self-criticism. There tends to be a lack of this in all organisations. Criticism is more easily given than taken: this I have seen at the universities, in Parliament, and perhaps it applies to the SSNC as well.

Yet nowhere is this as important as it is for political leaders. Even two thousand years ago, this was known. For instance, the emperors of Rome would have slaves accompanying them, pointing out their mistakes and reminding them of their own mortality. This kind of systemic self-criticism ought to become part of all Western governments, including superpowers like the US.

On the discussions about power grids, I noted that these are very large-scale projects. Sverker Molander was correct to point out that Africa does not necessarily have the incentives for adopting our solutions. There are problems with vulnerability, risk assessment, and general risk awareness.

Another of my suggestions in Parliament has been for encouraging education and research into risk science in Sweden, which I think has been neglected as a subject matter. We are not really risk aware; this is the reason why we tend to accept and implement ready-made technological systems. How to promote risk science in the West; I leave this as an open question for you to ponder.

Finally, I think it is dangerous for us to assume that our civilisation and use of resources is some sort of role model. On the contrary, we are in fact the main culprit in destroying living conditions on the planet. We should be very humble about this, and willing to learn from the knowledge which exists in other parts of the world.

Michael Rantil
Comments and reflections: The EU and Swedish government view on technology in the negotiations

As the current chair of the EU group on technology tasked with finding positions on technological issues in the climate negotiations, I will briefly give you a few thoughts on the current state of things as well as the EU position on technology and climate.

First, some comments on previous speakers. The word 'leapfrogging' is new to me, though I agree with the concept. The issue of geoengineering is in fact not at all discussed within the EU negotiation team, unless of course one considers CCS to be a kind of geoengineering. The EU

"There should be common agreement on technology objectives and road maps; not in order to force technologies upon countries, but rather to provide guidance for their future development."
Michael Rantil

believes CCS to be an important technology, especially for China, South Africa, and other coal-dependent economies. There is an internal debate happening within the EU as well, and it is exceedingly polarised: some countries are very much in favour of CCS, while others are strongly opposed. Still, the outcome is that we try to push for this technology, including within the negotiations; securing funding for demonstration plants in China, and so on.

Recognising that CCS is still an unproven technology, we always make sure to add that what we are promoting is safe CCS, and that further research and experience is in fact needed in order to conclude that it is a safe as well as economically feasible option. On the other hand, studies by the International Energy Agency (IEA) show that without CCS, the cost of meeting targets on climate rise by around 80 percent.

Johan Lilliestam described the advantages of smart grids; and certainly, the smart grid concept is a major priority for the EU negotiation team and something that we try to stress whenever renewable energy is discussed. This is also one of eight specially targeted areas on the EU research agenda.

Personally, I agree entirely about the importance of smart grids. Also, I share the view that the future energy system will be based on many different renewable energy sources. Interestingly, even during the 1980s the idea of solar plants in the Sahara were discussed; I recall that a Swedish consultancy conducted a study for the Department of Enterprise. It is, however, now probably appearing increasingly realistic.

As I said, I also agree with the concept of leapfrogging. We believe that in order to successfully confront climate change, action in developing countries need to be driven at the national level. Thus, we are placing much emphasis on institutional capacity building; we believe this to be extremely important. Developing countries need to be able to implement policies, understand technologies as well as maintain them; competence is needed at all levels, I would say.

Now, some words on the EU position, although I would guess that many of you have already heard most of it before. I would claim that the EU is the most ambitious party among developed countries, at least so far. Our targets are based on the findings of climate science.

We would like to see a high level of ambition among developed countries; the EU should not be the only party with far-reaching targets. We also need to bring aboard countries like Japan and, most importantly, the United States. As you may know our target for reducing emissions of carbon dioxide is 20 percent by 2020; but if countries like the US sign an agreement in Copenhagen, we are willing to raise that figure to 30 percent.

We do feel that it is necessary for developing countries to also limit the growth of their emissions, specifically by 15 to 30 percent below business as usual. This is especially important for large and somewhat developed countries such as China, India, and South Africa. We also believe that expanded carbon markets have a major role to play in this context.

The EU is willing to support the development, deployment and diffusion of technologies in developing countries. Importantly though, we think that all developing countries except least developed countries should prepare low-carbon growth plans. These should include expert analysis of the technologies that will be needed, and at what date; possible barriers for their successful implementation, and so on. The EU believes that it could provide assistance with removing some of those barriers; again, however, capacity building is central to making technology transfer possible.

Because throughout all of this initiatives by the private sector will be quite important, developing countries need to provide environments that are conducive to a scale-up of investment; including foreign investment. Also, the Climate Convention is not the only game in town. Other, existing institutions could have important parts to play in technology transfer, such as the IEA, the recently established IRENA agency for renewables, or when it comes to financing, the World Bank.

There should be common agreement on technology objectives and road maps; not in order to force technologies upon countries, but rather to provide guidance for their future development. In addition, we are willing to support regional centres providing capacity building and information tailored to the needs of individual developing countries.

The EU believes that in general, there is a need for increased levels of research and development. Personally, I think that with the creation of a carbon market, this will happen even in the absence of specific policy. The Major Economies Forum (MEF), which is a group of countries similar to the G20, has stated the target of doubling research and development levels by 2050.

Besides highlighting the obvious need for renewable technologies, the EU is also a proponent of energy efficiency and CCS, which we believe requires international cooperation for research and development as well as policy design.

As you know, there are also some tough issues in the negotiations. One is that we would very much like major developing countries to set mitigation targets of their own. So far, our requests for binding targets have been rejected in favour of non-binding arrangements. Still, although developing countries have stated their intention to act on climate change, the EU much prefers binding targets for all major emitters.

Another issue subject to much discussion concerns how action taken in developing countries should be financed. There is also debate on the institutional arrangements of financing: who gets to decide where the money goes, and so on. The developing countries have proposed a single large fund placed directly under the Climate Convention and jointly governed by the parties themselves.

However, as it is our belief that the funds for developing countries will come from many different sources, we think that a single fund is not appropriate. What the end result of this debate will be, I do not know; though I think it is possible that in the end the fund will be small. In any case, the proposal for a single massive fund is not endorsed by the EU.

Intellectual property rights (IPR) are also an issue. A number of developing countries are arguing that patents and other kinds of IPR constitute major barriers for technology transfer. Some claim that IPR should be free for all; essentially, that all developed countries should simply give away their technology rights.

Needless to say, the EU is of a completely different view, one shared with the US, Japan, and Australia. We are convinced that IPR are a prerequisite for all technological development. Thus, in this case there is real conflict; though I do not know how central this issue will be in the end, some developing countries are pushing it very hard. In the past, China has been one of the countries taking strong positions on IPR, but I think they are coming to re-evaluate where their interests lie, becoming more moderate.

The specific amounts needed in developing countries are perhaps 100 billion Euro every year. This figure is taken from a communication on financing from the EU Commission. It is only an estimate and there are other figures out there; still, I think it is reasonable to assume this is the correct order of magnitude.

Finally, a short comment on where the negotiations are headed. We have very recently finished another round of negotiations in Bangkok. While those talks did move forward rather slowly, at least the pace was quicker than at the previous Bonn meeting, and some progress was made. There was a fresh frankness about the underlying motivations and meaning behind our respective proposals for legal wording.

In the negotiations on technology, we are down to thirty-two pages of statements, forming the twenty-ninth edition of the negotiation text. In the end we need to get down to a couple of pages, or a single page, or perhaps only a few sentences. But I got the feeling in Bangkok that there was willingness, at least in the technology area, to press forward

and to be constructive; thus I am hopeful regarding the next round in Barcelona.

That is in a couple of weeks. The Barcelona talks will last for a full week, which I feel will be ample time for further discussions on technology issues. Perhaps by then, the time has come for making compromises. So far, what we have seen is mostly countries making statements of intention and interest, and some attempts to find common ground among different actors. However, little or nothing has yet been seen in terms of countries giving up previously held positions in order to reach an agreement.

What then for Copenhagen? Admittedly, there are some very complicated issues on the table, though technology is not really one of those. Some people are becoming increasingly pessimistic. But it could still happen, I believe. There is a great deal of high-level political discussion taking place; Western governments are practically lining up to meet with the Chinese leadership. Sweden is organising a workshop in China next week on technology and IPR issues. The MEF countries are moving forward, and the US as well. There could yet be a good outcome out of Copenhagen; I am, at the very least, not pessimistic about this.

Panel conversation and interaction with the audience

Question. Krister Holm, SSNC. On the key issue of intellectual property rights, I recently came across some statistics on patents for renewable energy technologies, such as wind, solar, and biofuels. The number of patents in these areas have increased dramatically; all the curves were pointing steeply upwards. But as you said, this is a controversial area. I understand that some developing countries are interested not only in technology transfer, but in production as well: they want to be able to develop solutions themselves. But because patents imply a monopoly situation, this may prove very expensive.

I know that in there are some flexibility in the rules of the WTO TRIPS[1] agreement; for instance, some of the Least Developed Countries do not have to implement the agreement until 2013. There is also some flexibility with so-called 'compulsory licensing', for example of pharmaceutical products in the case of national health emergencies. Some countries argue that climate change is a similar crisis, strengthening the case for less stringent IPR enforcement when it comes to renewable technologies. However, in bilateral and regional negotiations the EU tends to express little appreciation for any of these exceptions. Could you clarify the EU position on the pros and cons of IPR?

Answer. Michael Rantil. First of all, let me say that the place for discussing IPR issues is, and should be, under the TRIPS agreement rather than in the climate negotiations. I am not an expert on the TRIPS agreement, but as you mentioned there are some possibilities for compulsory licensing for environmental or health reasons, such as in the case of the AIDS medicine.

However, I would claim that the situation for energy technologies is completely different to that of medicines. There exists only one AIDS medicine, one patent. But in energy there are always multiple choices: there is no single patent holding back development. In addition, the situation with energy technologies is much more complex. A single wind power plant probably involves a thousand patents, each associated with different parts of the machinery.

Another point is that rules for patents are not identical across countries. For instance, if in Sweden a university receives a patent, this will accrue to the researcher employed by the university. Because patent laws are not the same, creating a global agreement in this field would mean changing national legislation worldwide.

Finally, very few patents for energy technologies are in fact taken in developing countries. It has been shown that patents tend to be taken in developed countries only; therefore, in practice IPR are really free of charge for developing countries, and we do not really understand what the problem is. I think we will continue to be rather tough on this point. Again, without patent rights, the pace of development will slow down considerably.

Answer. Pat Mooney. I strongly disagree. Granted, the degree to which patent regimes are concentrated to a small number of companies does vary between different industries. However, there are some areas that are central to the climate issue where patent concentration is already happening at a very profound level. This has not been properly understood, even by governments.

For example, in the area of nanotechnology, which is important for solar power in particular, but for wind power as well; here, already patents have been granted that are very fundamental. There has actually been patenting of elements in the periodic table; previously unheard of, it has now been done. There is a single patent covering thirty-three of those elements, and also all nano-wires produced using any metal are likewise patented. If you are not monitoring that, if you do not consider it important, you have a problem.

Similarly, when it comes to algae biotechnologies for sequestering greenhouse gases, and carbon dioxide in

1. Trade Related Intellectual Property Rights

particular, the patents being applied for by Craig Venter in the United States are extraordinarily broad. Some of them have not been granted yet, but others have; and they cover very fundamental aspects of creating modified algae. Thus, if you want to use algae for sequestering CO_2, unless you get in touch with Craig Venter you are not going to get anywhere.

The list goes on. Six companies have a joint monopoly over all 'climate-ready' genes for crops: large chunks of DNA which they have identified and which are common to virtually every plants species. These companies claim ownership of those genes regardless of whether they show up in coffee plants, wheat, rice, bananas, or indeed any plant species. They claim that they own any use of those genes, regardless of what stresses the genes are supposed to counter. These six companies working together – BASF, Dow, DuPont, Monsanto, Syngenta, and Bayer – is very predictable, and they are clearly trying to set up a monopoly.

Industrialised countries have effectively had industrial pollution rights for the last couple of centuries, but when it comes to solving the problem, developing countries are told that because of intellectual property rights they are not allowed access to the solutions? This does not make sense to me.

I also disagree with the statement that because many patents have not been approved by for instance African countries, these nations can just go ahead. First, this flies in the face of the reality that technological know-how is just as important as the patent information itself. Second, it is known what always happens when, say, Ethiopia decides to disregard a Monsanto-registered patent: the American Ambassador comes knocking, protesting on behalf of Monsanto, shutting operations down.

Answer. Eva Selin Lindgren. Some ten years ago, I attended a conference in Brazil where patent issues were discussed by representatives from both industrialised and developing countries. In particular, there was heated debate on patents for plant genes. There was a large outcry in reaction to reports of how developed country companies had come to Africa and Asia, patented the genetic information of local crops, and then claiming ownership had prevented local farmers from selling their produce in the usual markets.

Western companies such as Monsanto claim to own genetic information. But this is a philosophical and ethical issue: should it even be possible to claim ownership of the codes to living organisms? No; I think it should be ruled out, with implications for many green energy solutions. Though I admit I have not followed this issue very closely, I do think it needs to be addressed and solved.

Question. Johan Lilliestam. I would like to seize the opportunity to ask Michael Rantil another, possibly provocative, question on IPR. You said that you do not understand what the fuss is all about, given that many patents are not valid in developing countries. In all this it seems to me like developing countries, especially China, are asking for something that they know that developed countries will never agree to; they may provide some tiny portion of intellectual property for free, but all of it? It is never going to happen.

My question, then, is this: are developing countries in fact using the IPR issue as a sort of scapegoat argument, as an excuse not to agree to developed country demands in other areas? I was hoping for some comments on this speculation, although I am aware that it may be of a sensitive nature.

Answer. Michael Rantil. You mean to say that their stance on IPR is a negotiation tactic? First, let me say that in some instances, IPR could of course be a barrier for development. However, we feel that having the patent incentive is in the end more important. In any case, I think that there would be other ways around the IPR issue. You could for instance treat it as an economic barrier for development.

"Never forget this: by investing in fossil fuel projects, we are locking ourselves in."
Sverker Molander

We are considering putting this option forward in the negotiations. When developing countries draft their low-carbon growth plans, if they really do feel that the IPR issue forms a major barrier for developing their energy systems, it might be possible for them to say so in that document. We would then look into possible solutions and financing. This could be an option, though I dare not guarantee that we will propose it.

As for your question, as I said, one might note China was much more aggressive in this area than they are now. But other than that, I am not at liberty to say. Again, I am not sure that this issue will be very important in the end.

Answer. Niclas Hällström. This is certainly a key issue, and as has been pointed out, the deadlock is very evident. As to whether or not this is down to negotiation tactics, while there is some degree of tactics to all parts of the process, from my own point of view some very strong arguments have been put forward to indicate that the patent issue is real for China and others. This debate should be viewed in the context of the unprecedented technological transformations that need to happen.

Question. Man in the audience. A question for Pat Mooney. How would you define geoengineering; what qualifies as such? Is it a question of scale, or of the underlying motives for deploying certain technologies? Or is it rather a question of timeframe, the speed with which global effects emerge, making certain technologies a 'quick fix'?

Answer. Pat Mooney. Geoengineering is mainly an issue of scale, I think. If you want to make a change in terms of lowering temperatures or concentrations of greenhouse gasses, what you do is going to have to be on a very large scale, otherwise what is the point? Thus, we will be talking about massive areas of land, ocean, or air being used.

I should also say that there are connections between geoengineering and the CCS discussion. Remember, the efforts by companies to use ocean fertilisation was to get carbon credits for storing CO_2 at the bottom of the ocean. Biochar is another example. This is a way of sequestering carbon in the soil for long periods of time, burning biomass in a low-oxygen pyrolysis process and then digging the resulting charcoal into the soil.

When done on a small scale, as has historically been done by villages in the Amazon or in Africa, this is not geoengineering; but when done on a global scale, as newly formed consortia of companies are planning, it is. This is equally true with plantations. Having massive monocultures of trees in Brazil or in other places has to be considered a form of geoengineering, even if it is done with the aim of securing carbon credits.

Remark. Sverker Molander. These discussions may benefit from one simple insight: the best fossil fuels are the ones that stay in the ground. Once the carbon leaves the ground, it causes all kinds of problems, as we know; and trying to put it back may prove much more difficult than simply leaving it be. The problem is that people who have poured large amounts of money into fossil energy systems will want some payoff for their investment.

As a result, one option which I feel needs to be put on the table is finding ways to stop the flow of investment into fossil fuel technologies. For instance, the German-Russian natural gas pipeline set to run through the Baltic Sea has been subject to much debate within Sweden; and I find strange that people are prepared to invest in such a project given the risks as well as the lock-in effect resulting from the pipeline not paying off until after several decades. Never forget this: by investing in fossil fuel projects, we are locking ourselves in.

Question. Woman in the audiece. I would like the panel to elaborate on CCS, because you have expressed quite differing

"The EU is tackling these issues in the worst possible way, by allocating 300 million certificates from the Emissions Trading System to CCS plants every year. This will further kill the carbon market. "
Johan Lilliestam

views on this technology. Some have shown a great deal of optimism, while others have been very critical. Please discuss this further.

Answer. Johan Lilliestam. First of all, I agree with Sverker Molander's point on the lock-in of fossil fuels. The plants are being built today; but they stand for fifty years, meaning they will still be around in 2060. Even worse, CCS is not a technology that works today, which means we will only start building those plants in a decade or two. When all of us here are dead and gone, even the young ones, they will still remain unless we shut them down prematurely; but if we expect this to happen it means they are no longer profitable, and should never be built in the first place.

That is my first point. The second is that anyone can see that CCS is a transition technology. It is impossible, technically impossible, to make CCS plants carbon neutral; they will emit CO_2 into the atmosphere. As a result, we already know that this is not a technology that can last. Still some are arguing that we pour massive amounts of money into making CCS operational and competitive. Assuming it will even work, we already know that very soon after it comes online we will need to shut it down.

Why not instead get started building the systems that we know will be the ones used in the end? Why not instead invest all of the many billion Euros currently being spent on CCS on wind, solar, biomass, all of these renewable technologies? Doing so immediately is obviously the cheaper solution.

But, no; the EU is tackling these issues in the worst possible way, by allocating 300 million certificates from the Emissions Trading System to CCS plants every year. This will further kill the carbon market. Already we know the market will not deliver results as it was supposed to, because in many ways it provides perverse incentives; but I fear this will be the final blow.

In the draft for the EU's CCS Directive, there were proposals for much more efficient regulation, but it was removed from the final version. The draft stated that after 2015, no more coal-fired power plants may be built on European soil that emit more than 350 grams of carbon dioxide per kWh. That is more like it; a moratorium like that would have some real effect.

Going beyond 2015, in this way we would open the door for natural gas plants which are highly flexible and would in any case be needed to smooth out intermittencies caused by renewables; in the short term, until 2025 or 2030. In the long run of course, even natural gas needs to be phased out. But for now, what we need to do is to impose regulations like the 350 gram limit I mentioned, and then gradually tighten them until in two or three decades, no new coal plants would be allowed. CCS amounts to giving away a lot of money and getting nothing in return.

Remark. Niclas Hällström. It is interesting to note the interplay between all of the seminars in this series. What has just been said connects very strongly with last seminar's proposal by Tariq Banuri on the global feed-in tariff and the need for massive, front-loaded public investment in order to really drive down the price of renewable energy technologies and speed up their deployment.

That means: lots of money spent in the short run, but money which pays off very quickly and provides the crucial benefit of renewables that are competitive on the market, choking off fossil fuel investment as rapidly as possible. It means a kind of dual push-pull strategy which currently is completely absent from the negotiations. Taken together, I think these two seminars are very powerful in making that point.

Answer. Michael Rantil. I would like to point out that in the negotiations we are not mainly pushing for CCS within Europe, but rather for its use in countries like China. On the economics of CCS, our figures tell quite a different story than the one just outlined by Johan Lilliestam. Indications are that in the short term, CCS is a very cost-effective solution for China, South Africa, and so on. The fact of the

"Only the last few years, we have seen a number of new examples of neo-colonialism in the shape of land grabs in Africa and elsewhere."

Pat Mooney

matter is that the Chinese are building one coal-fired power plant a week, and they will continue to do so in the near future. This is where CCS could have a part to play if it functions; which has yet to be demonstrated.

Remark. Niclas Hällström. Again, there are interesting links with the last seminar. One of the key arguments for a global feed-in tariff was just that: providing the framework and incentives for making renewables the obvious choice for countries like China, so that they will no longer go for coal as their main power source. Coal is cheap now, yes; but how to make renewables the cheapest option in the future?

Question. Woman in the audience. During the break I put a few questions to Johan Lilliestam, and I thought that my classmates might be interested to hear the answers. We discussed the ethical implications of constructing large-scale solar installations in North Africa; is it going to be mutual dependence and exchange, or is this yet another form of neo-colonialism taking place at the expense of local people? The answer was that this was a very hot topic, and I think that many of us wonder how it will play out.

Answer. Johan Lilliestam. Or course, I have to flag for this because this is what I do for a living, and it is indeed much debated. However, I want to stress that if North Africans feel exploited, if they see a risk of colonialism, they will not go along with it. End of story; full stop. Either we stay away from neo-colonialism, or this project will not happen.

Secondly, we need to keep an open dialogue with the other party. Regrettably, this has not happened so far, and is the major deficit in the DESERTEC project for solar power in the Sahara. Specifically, we need to ask the North Africans the following questions: what do they want; what do they expect; and what do they need? Basically, electricity is the answer. For instance, Algeria has an annual growth in electricity consumption of eight to ten percent. This is a tremendous amount, and they have no funds for building additional power plants themselves.

Then, once we know those answers, we look at our own objectives. What do we want? Renewable electricity. What do we need? Access to their deserts. What can we offer? Technology and financial resources, both of which the North Africans lack.

Finally, we strive for the common ground. How can we create a system which provides them with what they need while also meeting our objectives? We do have the capacity for building power plants and could siphon off, say, half of the renewable electricity to the country where it is being produced; at their own market prices, because they can afford little else. Thus, we would subsidise their electricity costs in exchange for being allowed to use their soils.

In fact, even if we give the source country a third of the electricity produced free of charge, it would still be cheaper to build such reduced-effect solar power plants in Morocco or Algeria, with a cable running to Spain, than to construct it on Spanish soil. That is how much more efficient these African sites are. Thus, besides the fact that this project will never fly if the North Africans suspect neo-colonialism, there is in fact a business case for mutually beneficial solutions.

Also, besides being an issue of physical interdependency in terms of land and resources, this is a case of economic interdependency. Usually, when I talk about these ideas, the fear is that we will become reliant on them rather than the other way around. What about Khadaffi, people ask; what about Islamists?

My response is this. This might be a problem, granted; but under normal conditions countries have no reason to hurt each other, and I cannot think of any reasonable cause for them to do so. Still, for the sake of argument, let us say there is an Islamist revolution like that in Iran. Let us say that the new leadership wishes to punish the heathens. Moreover, let us assume that the renewable electricity system has been technically very poorly designed, so that an African

country can actually create blackouts throughout Europe by pulling the plug on us.

Let us assume all of this. Now, even though the costs of a blackout are very high and the costs of electricity is quite low, the North Africans will still be more dependent on the electricity than us, under any possible economic growth scenario. Thus, we need not fear them simply because even an Islamist fanatic will never voluntarily ruin his own economy.

As I said, it is rather the other way around: they should rather fear us. The main issue is not security of supply for us, but security of demand for them. Again, what we need to do is to make them feel secure about us not pulling the plug on them. Interdependency, mutual benefits, and mutual trust: those are the prerequisites for successful solar power from North Africa.

Answer. Pat Mooney. Regardless of how much land is involved in this project, let me just say that neo-colonialism works very well, has done so for a very long time, and has certainly not stopped doing so either. Thus, it is incorrect to claim that if the North Africans smell neo-colonialism this project will fall apart. Only the last few years, we have seen a number of new examples of neo-colonialism in the shape of land grabs in Africa and elsewhere, much of which has in fact been driven by Sweden. Biofuels, or agrofuels, is a clear-cut example of neo-colonialism, feeding our cars instead of feeding them.

This is not to say that what you are suggesting in terms of using a small piece of desert for producing electricity is not worth exploring; I think it is. Just do not assume that neo-colonialism is dead.

Concluding remarks

Pat Mooney. Wrapping up on the subject of technology, I should point out that at the ETC Group we have been pushing for increased international monitoring of new technologies. There is actually a history for it: in fact, there was a Swedish proposal dating back all the way to the 1970s for something called SIESTA, which was basically an international convention for the evaluation of new technologies. It was presented to the Rio Earth Summit in 1992; but then, somehow SIESTA went to sleep, as it were, and never actually materialised.

Such initiatives are now badly needed, because in fact there is no capacity at the international level for governments or indeed for anyone to track new technologies. We have no way of knowing what is coming or what its implications are going to be until we find ourselves in the middle of a full-blown crisis, where all of a sudden we are confronted with for example genetically modified crops generating massive controversy.

Then, finally, we try to address the technological challenges; but what we need is a system which lets us monitor technologies from the lab onwards and provide early warning if there are problems, so that we can smoothly introduce good technologies and stop the bad ones.

We also have no capacity at the international level for monitoring the ones introducing new technology. There used to be a UN Center on Transnational Corporations, as well as a UN Center for Science and Technology for Development. Both of these were killed off by the United States government back in the early 1990s.

Thus, there is no capacity for monitoring either those introducing and controlling new technology, or the technologies themselves. We need to have that, and so I feel it is time to start transparent negotiations on an international convention under the United Nations. We must do so before we become completely entangled in nanotech, synthetic biology, geoengineering, and all of the wonderful ideas that are coming down the pipeline as we speak.

Eva Selin Lindgren. Johan Lilliestam has talked about large-scale systems, but let us not forget that there are also small-scale ones. Sverker Molander mentioned how families and groups of households want to be able to manage their own electricity supply, and in fact already there exist such small-scale systems in the shape of solar panels, windmills, and so on: even in Sweden, this is true. We should not overlook these solutions: solar cells can be used for small-scale systems as well as for large projects.

This is not in contradiction with the fact that large industries for instance may require the existence of large systems. But particularly in Africa, I believe regional or local solutions involving just a few households would be preferable to many.

Sverker Molander. The idea on an international convention for monitoring new technologies is very interesting, I think. It so happens that my department is looking into taking on something similar in the future in terms of integrated assessment of technology. I should also point out that my presentation was not based on my own personal research, but on that of a very diverse group of researchers: engineers, economists, human ecologists, political scientists.

We are thinking about developing new methodologies for impact assessment. This is a big thing in the world today. Often, it is conducted by consultants, and while many of them are quite good, we feel that a more academic approach would prove useful. We are fortunate to have such an interdisciplinary team of researchers, and given that funding is also now becoming available, things are starting to look quite promising.

Niclas Hällström. One of the key messages of this seminar, I think, is that to assess technologies too narrowly does not really make sense. They need to be understood in a context of corporate power, interests, and patent issues. In order to understand what is going on, you need the kind of work being done by the ETC Group in foreseeing what is about to

come, as well as uncovering the fact that in many cases research across very diverse fields is in fact driven by the same actors.

Addressing these issues is long overdue, and there is a case for trying to build political momentum for doing so. As Pat Mooney pointed out, this agenda does have a history in Sweden and would resonate with long-standing aspirations in this country on precaution and common sense when it comes to technological development. Even in the negotiations, I think there is a window of opportunity for this; though very late in the process, as we know the talks will drag on, being still quite incomplete by December.

Participants

Pat Mooney

is founder and director of ETC Group (formerly RAFI), a civil society organisation involved in research, analysis and advocacy on issues relating to technology, environment and development. Mooney and the ETC group has pioneered work highlighting environmental, health, social and cultural concerns in relation to a number of new technologies. It was one of the first to point to the implications of the convergence of the seeds and pesticides industries, followed the emergence of biotech at its early stages and exposed the first patent on human cell lines, and has in recent years intensively followed the development of converging nano-scale technologies. Mooney has followed the emergence of geo-engineering during the last few years and was instrumental in getting a moratorium on ocean fertilisation in place under the Convention on Biological Diversity in 2008.

Johan Lilliestam

has worked at the Potsdam Institute for Climate Impact Research in the research domain Transdisciplinary Concepts and Methods since 2007. His current research focus is on issues of European and external electricity market issues, especially large-scale imports of renewable electricity from North Africa to the EU. Mr. Lilliestam's research experience is mainly focused on European energy and climate policy, especially on issues of international electricity trade and renewable electricity. He holds a Master of Science degree in environmental sciences and physics from Göteborg University, Sweden, and a Master of Arts in environmental management from the Freie Universität Berlin, Germany.

Sverker Molander

is Professor of Environmental Systems Analysis, Energy and Environment, Chalmers University of Technology. His research has employed different "system methods" for assessing environmental repercussions caused by various human actions connected to water and wastewater systems, product life-cycle systems, and agriculture. In interdisciplinary research he is dealing with socio-technical and ecological prerequisites and consequences connected to rural electrification based on renewable energy sources in East Africa and the use of system approaches for organizing and supporting learning processes.

Eva Selin Lindgren

is a member of the Swedish parliament since 2006. She was previously professor in Physics/Environmental Physics at the universities of Göteborg and Borås and was dean of the joint sub-faculty of Environmental Sciences at Chalmers and Göteborg universities 1990-1997, which had close cooperation with the city of Göteborg and some of the industrial activities in the city. Her main research interests have been directed to trace elements in humans and to studies of air pollution in different environments, with emphasis on airborne particle pollution in some Swedish and African locations. She has taken part in several research boards and committees in Sweden and Norway, ranging from environment and development to ecology, building science, interdisciplinary research and preservation of our cultural heritage. She has educated PhD students in African and Asian countries.

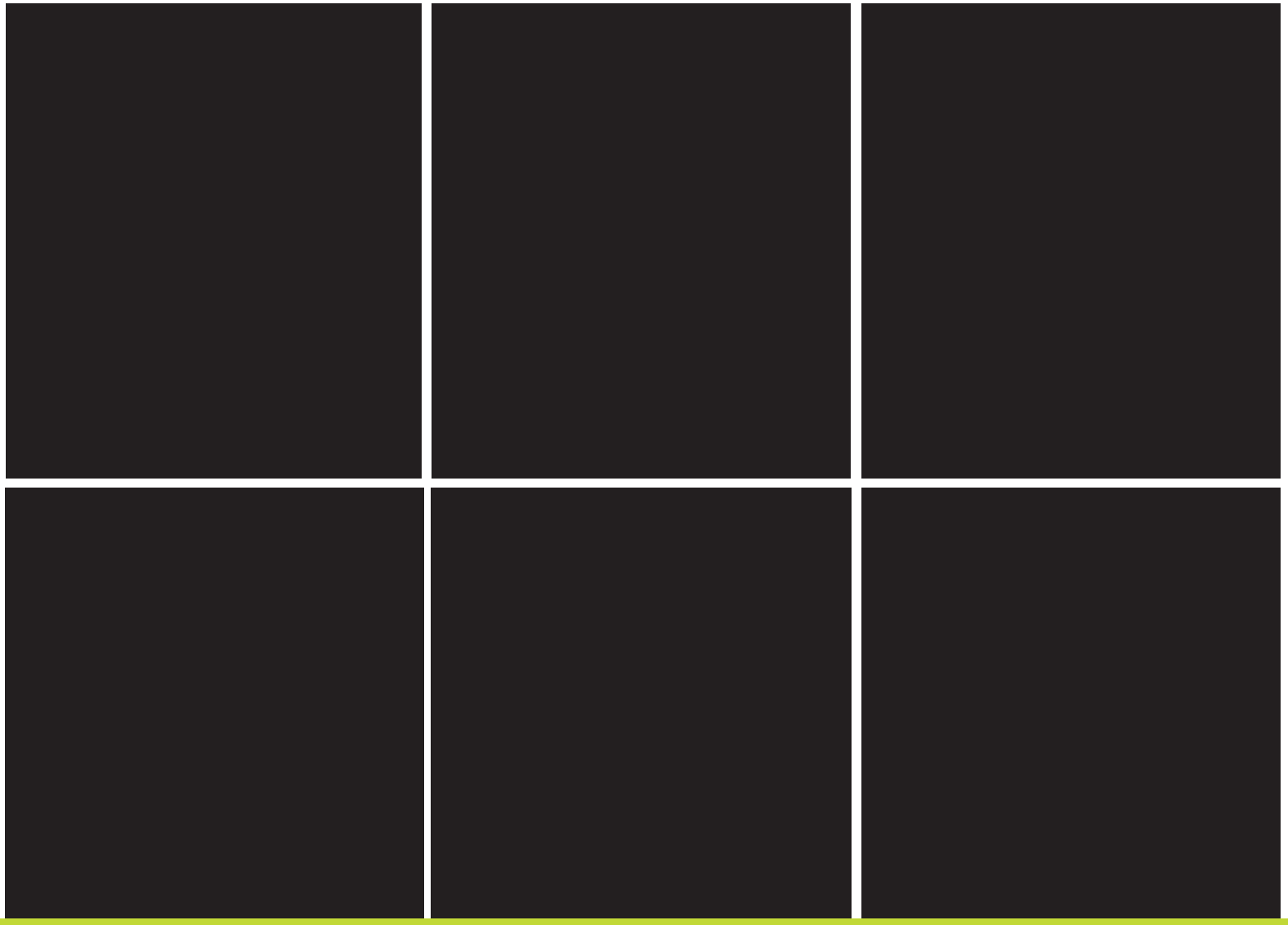
Michael Rantil

is employed at the Energy Technology Department of the Swedish Energy Agency, but is currently based at the Swedish Ministry of the Environment to work with the climate negotiations. He is presently chairing the EU group on technology in the UN climate negotiations. Rantil is a member of the UNFCCC Expert Group on Technology Transfer, and deputy chair of the International Energy Agency Climate Technology Initiative.

Moderator

Niclas Hällström

works as expert on climate at the SSNC International Department, focusing on policy issues connected to climate and development. Before joining SSNC in 2008 he worked with the Dag Hammarskjöld Foundation for many years, and, before that, was part of creating the Centre for Environment and Development Studies (Cemus) in Uppsala, where he still teaches. He is presently setting up an independent initiative – ”What Next?” – in parallel to the work on climate.



Seminar report from Seminar no. 7:
Going fossil-free:

How can the EU and Sweden take the lead?

The EU and other industrialised countries need to reduce their own greenhouse gas emissions by at least 40 percent by 2020. Sweden, as EU president, could make an important contribution by taking the lead to show that this is not only possible, but desirable as well. When the EU takes the first step, other industrialized countries will follow. Ambitious domestic reduction targets within the EU are likely to strengthen the competitiveness of European companies. It will also be necessary for rebuilding trust in relation to developing countries in the climate negotiations. What is the positive vision of a fossil-free society that is climate-friendly while providing a high quality of life? What is the role of the private sector in getting there? Is it good economically? The seminar showed that it is cost efficient, necessary and possible to achieve a 40 percent cut of emissions within the EU and other industrialized countries until 2020 – without off-setting.

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues7

Participants: Rajendra Kumar Pachauri, Chairman, Intergovernmental Panel on Climate Change (per video), Ola Alterå, State Secretary, Swedish Ministry of Enterprise, Energy and Communications, Johan Rockström, Executive Director, Stockholm Environment Institute, Bassam el Mattar, General Manager for Sweden, Fritidsresor, Niclas Kjellström-Matseke, CEO, the Swedish Postcode Lottery, Tomas Wallin, CEO, Veolia Transport, Lisbeth Kohls, Senior Vice President Corporate Responsibility, ICA, Mikael Robertsson, Environmental Manager, COOP, Emma Lindberg, SSNC, Niclas Hällström, SSNC Mikael Karlsson, President, SSNC

Project coordinator: Niclas Hällström Moderators: Emma Lindberg and Pontus Schultz Summary by: Claes Ek The seminar took place: 6 November 2009, Norra Latin, Stockholm Layout: Espmark & Espmark Printing: Stockholm December 2009
www.naturskyddsforeningen.se/keyissues

Produced with financial support from Sida. Sida did not participate in the production of this publication and holds no position on the opinions contained therein.

Going fossil-free: How can the EU and Sweden take the lead?

Introduction

Emma Lindberg, climate policy advisor, SSNC

Welcome to the seventh seminar in the 'Key Issues' series. Our topic for today is how Sweden and the EU could take the lead, reducing emissions of greenhouse gases by 40 percent by 2020 within the EU – without off-setting. To that end, we have invited representatives from the scientific community, government, and the private sector.

The fact that several top executives from major Swedish companies will be participating at today's seminar reflects how all of the work being done by the SSNC on climate issues is coming together for COP15 in Copenhagen. A year ago, we asked ourselves: as the largest Swedish environmental NGO, how can we best contribute to getting a good deal out of Copenhagen? Our conclusion was that we need to work together with other influential stakeholders in Swedish society.

Thus was born the 'Climate Relay': a collaboration between us at the SSNC, company executives, and municipal commissioners in advocating a powerful climate deal. The basis for our campaign has been to recognise both the non-negotiable boundaries of the global climate, and the imperative of development and poverty reduction.

There are two implications to this. First, by 2020 developing countries must as a group reduce domestic emissions by 40 percent. Second, investment for climate solutions in developing countries must be drastically scaled up, while still being additional to foreign aid commitments.

Over the course of the year, the Climate Relay has demonstrated that there exists broad support for these points throughout Swedish society. Some 200 companies, five of which are represented at today's seminar, have joined the campaign. We have seen citizens, businesses, and policy makers working together in making the journey of the Relay possible. And I do mean journey in both a literal and a virtual sense: in May, as the campaign was taking off, some hundred people cycled from the west, north and the south of Sweden to Stockholm carrying the Climate Baton. Since then the baton has been carried by solar-powered go-carts in Umeå in the north of Sweden, as well as by a CEO who won the Gotland Runt sailing race.

A few months back, we brought these experiences, other stories of CEO engagement and the climate baton to the UN negotiations in Bangkok. There, we discussed the broad support of companies and municipalities for strong action on climate change with for example the Micronesian negotiator. She expressed her enthusiasm over the broad Swedish awareness with regard to the level of ambition needed to stay within planetary boundaries. Also, she was happy to hear so many of us agree that ambitious climate policy generally makes good economic sense. Yet, from her perspective, even if the industrialized nations cut their greenhouse gas emission by at least 40 percent it will be too little: even if we reach such targets sea levels will still rise, putting her nation at risk. We cannot afford to forget just how serious the climate crisis really is.

Support for a strong outcome in Copenhagen is growing, at least outside of the negotiations. It was very encouraging to see how on October 24th, citizens of 181 countries all across the globe rallied in a simultaneous call for levels of ambition on climate change that respect the science.

Looking ahead to Copenhagen, how does the current state of negotiations square up to our demands? First of all, we may observe that current developed country targets amount to reductions of between ten and sixteen percent on 1990 levels. Thus, there is a major gap between what is needed and the pledges made so far; all of us would benefit from bridging that divide. At the SSNC, we have also repeatedly stressed that all of the developed countries' reductions up to at least 40 percent must be domestic. The EU´s 2020 target is, as we all know, far from domestic. Maybe as much as 1/3 or half of the EU target can be achieved outside the EU. This is far from enough.

Also, progress on the financing issue has been agonizingly slow. Nonetheless, we have seen some recent baby steps taken by the EU: it is now willing to take its "fair

share" of responsibility for funding action on climate change.

For now, possibly the greatest obstacle is that the United States is not yet ready for taking strong action. Given this, how should the rest of the world act? Do we make excuses and hide behind the lack of momentum in the US Senate? Or do we recognize that, contrary to what some believe, the future winners will not be those countries dragging their heels, but the ones that go aggressively fossil-free at an early stage?

Rajendra K. Pachauri, Chairman, IPCC

I am delighted to see the SSNC organising events such as this one to build up momentum and to focus on what can be done to reach a strong agreement in Copenhagen. As has been emphasised, it is indeed going to be critical that developed countries take the lead. This is essential for a variety of reasons. Firstly, there is the issue of historical responsibility, which it would not be possible to overemphasise. Secondly, because income levels are higher and technological capacity is greater in those developed countries that are the largest users of fossil fuels. This is where the potential for bringing about shifts in energy use is also the greatest.

I think it is critical that developing countries, and the EU in particular, reach an agreement to reduce their emissions by 40 percent over 1990 levels by 2020. If they were to do that, then clearly they would set a benchmark for the rest of the world. Crucially, the technologies and solutions used in reaching such a target would then be emulated by developing countries across the planet.

How might it then be possible to achieve the target of 40 percent reductions? In my mind, it is not really a major challenge. There are so many examples across the globe of shifts in energy production. For instance, France went largely nuclear in its electricity production after the first oil price shock of the 1970s. Doing so was a deliberate decision which ensured energy security.

I am not saying that every country in the world needs to go nuclear; there are other examples. Denmark likewise made a conscious decision on energy and has since seen remarkable success in mobilising technological capability related to wind power production. And in the bargain, technologies have been developed which are now being used in other parts of the world. Twenty-five years ago, one would never have imagined that the very technologies that are defining the energy sector today would ever have been produced; and yet here they are.

I also wish to emphasise the need for lifestyle changes. Unfortunately, this is an issue which does not receive a great deal of attention. After all, what I am talking about would not really be a radical shift to pre-industrial standards of living. Instead, it is a matter of pursuing standards that are on a similar level with those currently enjoyed by developed countries, but in a manner which is much more responsible and responsive to the need for protecting the environment. Our natural resources are being depleted rapidly, and it is in any case just a matter of time before some of the negative consequences of being on this path will impact negatively on our ability to pursue economic growth.

Thus it is really only a matter of enlightened self-interest to recognise that acting today means very low costs of reducing greenhouse gas emissions; instead allowing our industries to become ever more intensive in emissions and the use of energy clearly implies much greater costs over time. Therefore, it is both prudent and economically viable for us to take action immediately, substantially reducing emissions of greenhouse gasses.

I should emphasise that such mitigation measures generate immense co-benefits. These are: much lower levels of air pollution and associated health benefits; much higher levels of energy security, which is a public good affecting the welfare of the entire human race; rising rates of employment as societies move into, say, renewable energy production; and drastically increased energy efficiency within every sector of human activity, including buildings and transport.

Finally, last but not least, some of the poorest and most vulnerable countries in the world will benefit greatly from

"Setting a target of 40 percent reductions within Europe, then, has global implications. To the benefit of European business and industry, Europe would become leaders of low-carbon technologies and capture a large share of the market of tomorrow, which will certainly be low-carbon."

Rajendra K. Pachauri

mitigation, because the effects of climate change on their agriculture is likely to be extremely severe. Thus, by taking action we would give other parts of the world a better chance at pursuing improved standards of living.

Setting a target of 40 percent reductions within Europe, then, has global implications. To the benefit of European business and industry, Europe would become leaders of low-carbon technologies and capture a large share of the market of tomorrow, which will certainly be low-carbon.

Still, what I would like to stress are the benefits which would emerge all over the world; particularly for the most underprivileged, who have been in no way responsible for the problem of climate change, but are certainly going to be its main victims.

There is an ethical dimension to this that I believe that Europe is generally quite sensitive to. May I then appeal to you to mobilise all the resources that are required, all the public opinion, for policies aiming towards a 40 percent reduction? This will turn out to be a win-win solution: not only would Europe help in solving one of the greatest threats to humanity today, but it would also capture the whole range of the co-benefits mentioned, enhancing welfare at practically negative cost. This is an opportunity which is really much too attractive to pass up.

I appeal to you: let us look at this issue in a longer-term context, let us not ignore its widest implications for all parts of society, all over the planet. If Europe, being enlightened nations and in the lead on climate change, takes that leadership one step further, other countries will have no choice but to follow. It would be good for the world, for this generation as well as for the ones yet to come.

Johan Rockström

Presentation of an upcoming Stockholm Environment Institute (SEI) report on making forty percent emissions reductions within the EU by 2020

This will be a kind of 'sneak peek' of our work since the actual report will not be released until December 1st. The point of departure for our work is the gap between what is considered politically realistic, and what is necessary from a scientific point of view. This divide, unfortunately, is growing as we approach Copenhagen.

We cannot imagine the reason to be a lack of money, since every analysis is indicating that deep emission cuts will only cost a total of between one and three percent of GDP, at most. In part, we think the issue is rather a lack of political confidence in taking strong action. Thus, we need to demonstrate that reducing emissions by 40 percent throughout the EU, and doing so in a manner which is economically defensible, is possible.

The reason why I would argue that the situation is desperate, and why forty percent reductions will be crucial, is of course that our knowledge of the risks associated with climate change is growing with tremendous speed. In 2001, it was believed by most climate scientists that the risks of major catastrophes happening – collapse of the Greenland ice sheet, of inland glaciers, of the Indian Ocean monsoon, of rainforests, and so on – only started to become really significant at around four or five degrees of warming.

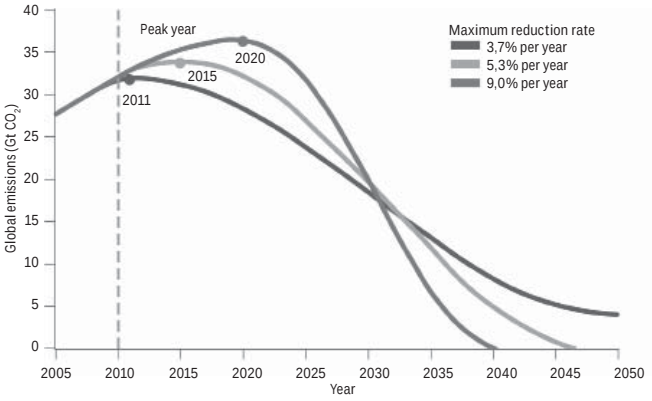
Just eight years later, the science is telling us that these impacts are in fact more likely to hit around three to four degrees of warming. New pieces are being added to the puzzle, indicating that the situation is graver than previously thought. We have already seen warming of about one degree. Enough energy has been invested to push us up to two degrees; this warming is in the pipeline, so to speak. And recent science suggests that the vulnerability of the climate system is such that already today we may really be looking at up to three degrees of warming.

A month ago we published a paper in the journal Nature, asking the question: what are the implications for climate

policy of having a holistic approach, looking at the entire Earth system rather than one part of that system at a time? With such a perspective, what do we need to do in order to avoid catastrophic feedbacks from the climate system? We identified a total of nine other large-scale systems with which the climate is constantly interacting. Because we are having such a profound impact, the precautionary principle must prevail.

Then, two weeks ago came the scientific 'last straw', as the German climate research centre advising Chancellor Angela Merkel published an analysis of what it would take to have a reasonable chance of keeping temperature rise below two degrees. Even if we manage to make global emissions peak by 2015 – and this is highly unlikely – then by 2050 we will still need to reduce emissions, not by fifty percent or eighty percent, but by one hundred percent. We will need to completely decarbonise all societies on the globe within forty years. And if emissions do not peak until 2020, then the date when we must go completely fossil free will be already 2040.

The world's CO_2 budget



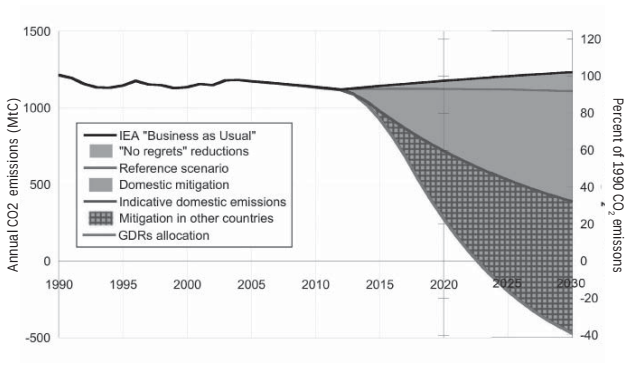
Examples of global emission pathways in compliance with a 2 ºC guardrail. To have a 67% chance of staying below 2 degrees annual reductions will need to be 9% a year if emissions peak as late as in 2020. If they peak in 2011 the annual reductions are a lot less. Source: WBGU, 2009.

There is no way around it: a European target of forty percent reductions by 2020 is the bare minimum of what is necessary according to the science.

Then there is also the development challenge. Even if all developed countries were to achieve forty percent reductions until 2020, staying within the safe limits of the climate means that developing countries would still be left with an enormous challenge to reduce their own emissions. There is no way that we could stay within those limits if the majority of developing countries of the world do not make very radical emissions cuts of their own. Acknowledging this fact, we have arrived at the conclusion that further cuts for developed countries will in fact be necessary.

What does this mean for the EU? Adding up a domestic forty percent reduction with the extra amount that is the EU´s fair share in assuring that the world as a whole meets a two degree target, we find that total equired reductions exceeds one hundred percent by 2020. Obligations beyond forty percent could be met by the EU financing actions in developing countries. Combining scientific imperatives with development considerations then leads to a much greater challenge in terms of both domestic policy and financing of mitigation in other countries.

Implications for European Union



The need for EU emissions reductions, domestically as well as internationally. Even with 40 percent domestic recuctions by 2020, the EU will need to finance an additional 40 percent in developing countries. Source: SEI 2009.

Our analysis shows final reduction targets in 2050 of approximately one hundred percent for the entire EU-27. The question is whether or not these targets are even realistic;

"The Swedish success in phasing out of fossil fuels is a result of twenty years of policy reform; not the least through a long-standing carbon tax of 100 Euro per tonne of carbon dioxide, which has been instrumental in causing the strong shift from fossil fuels towards biomass pellets. We assume these measures to be possible to implement across much of the EU."

Johan Rockström

would it be possible for all countries of the EU to take on these kinds of commitments?

Our analysis has been carried out by colleagues at the SEI: by Charlie Heaps and researchers at our Boston office. Again, the question is: can the EU reduce domestic emissions by forty percent by 2020, and by close to one hundred percent over the next forty years?

Our approach is quite standard, entailing a sectoral, stepwise analysis, examining in turn transport, industry, households, services, energy supply and also the agricultural sector of the economy. Of course, these are in fact the major emitting sectors.

I will briefly summarise a few key features of our analysis. Not all details about future technologies and assumptions made need perhaps be brought up at this point; for now I will only mention a few highlights. I do wish to emphasise that work on this report has been progressing for quite some time; it has been a step-by-step, country-by-country affair. We have put in the same amount of effort in analysing the Estonian situation as in assessing the French economy. We have incorporated all available data concerning emissions of greenhouse gases as well as sectoral opportunities in regard to new technologies and national regulatory policy.

All of this has then been fed into our energy model, LEAP, which is being used in 150 countries across the world and which might be said to be the mainstream model under the Kyoto Protocol for analysing national energy systems.

A number of 'boundary conditions' were also applied. Nuclear power is assumed to be phase out. Carbon capture and storage was not permitted. Likewise, we assumed there would be no largescale use of biofuels. In addition, we focused on domestic emission cuts only: no offsetting of emissions was allowed.

One mistake may be admitted: the study included emissions only from the production of energy, electricity, and the like, so we exluded the energy embodied in imported goods. For instance, Swedish emissions would likely be ten to fifteen percent greater if our net imports of consumer products were also considered. Thus, in this sense our analysis might actually be said to be conservative, because the emissions cuts needed will be correspondingly larger.

Finally, we make the normative assumption that it will not be possible to escape this crisis purely through economic acceleration. We need to accept some lifestyle changes; also, based on existing science, we assume that due to action on climate change the overall EU economy will grow by a total of sixty percent until 2050 rather than the eighty percent of business-as-usual. Still, although there is some minor slowing of GDP growth in our analysis, the scenario remains very much a story of continuing growth, at least until 2050.

Now, starting with the transportation sector, we assume a positive transformation towards less transport. Compared to the baseline scenario, motor traffic drops by around twenty-five percent by 2020 and by approximately half by 2050, as part of a major shift towards more appropriate working methods as well as a more efficient public sector. We assume that twenty-one percent of cars are hybrids by 2020, and that two percent are fully electric; but also that by 2050, all cars are electric. This is an important assumption. In addition, there is strong investment in trains and hybrid electric busses, though only sixty-five percent will be electrified by 2050.

What is the final effect of all this? The forecasts of the European Environment Agency and the International Energy Agency (IEA) are for continued growth of energy use in transport and also continued dependence of fossil fuels. In contrast, our analysis of what is possible and what is needed within the transport sector shows that fossil fuels are phased out quite rapidly, so that half of all transport will be electrified by 2050. We conclude that in order to meet the domestic forty percent target, both technological breakthroughs and major lifestyle changes will be necessary. Still, we think that the target is within reach.

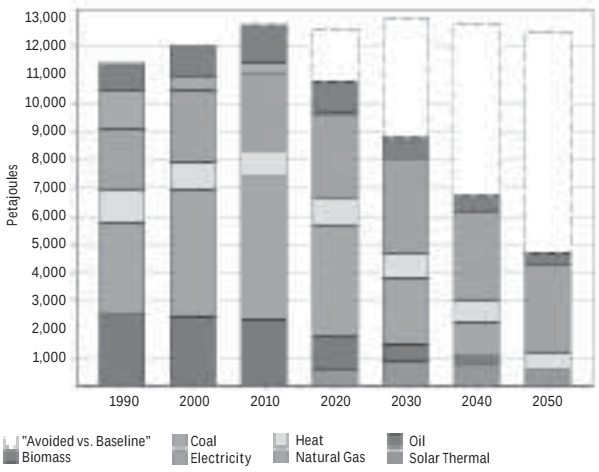
When it comes to the transformation of industry, one very thorny issue is that going fossil-free will require major investments in new infrastructure and systems of production, consumption, and transport. Bearing this in mind, we have assumed a falling use of energy in many industrial sectors,

due in large part to increased energy efficiency. We assume for instance that the steel manufacturing industry, which over the last half century has already seen very significant progress in terms of efficiency, enters a new phase of further efficiency gains by shifting from coal use to natural gas and biomass. We also assume the widespread adoption of the more efficient steel production processes, which are already available on today's market.

The cement and chemical industries likewise enter a period of rapid efficiency gains. In the end, we arrive at a state of affairs where by 2050, overall energy use by industry has been slashed by roughly fifty percent against business-as-usual. Once again, this is based on a stepwise, sectoral analysis of what is technically possible.

Moving on to households, the focus is similar; our analysis assumes that essentially the entire EU moves towards a building standard which is close to today's passive houses. I think that most would consider this to be entirely feasible, even if it is done through an ambitious policy of retrofitting existing offices and housing. Also note that under our scenario electricity use is constant throughout this process. This is because the general trend is towards increased demand for electricity, which is only partly offset by the major efforts made for increasing the energy efficiency of households.

Household Energy Demand



Household energy demand by fuel. Source: SEI 2009.

The main conclusions are that use of natural gas in households and in the service sector decreases; and there is near-complete phase-out of oil dependence in households. Of course, the latter is something that Sweden has already successfully achieved in district heating. We make this point in the report as well: the Swedish experience could serve as a role model for the EU as a whole.

It might also be noted that the Swedish success in phasing out of fossil fuels is a result of twenty years of policy reform; not the least through a long-standing carbon tax of 100 Euro per tonne of carbon dioxide, which has been instrumental in causing the strong shift from fossil fuels towards biomass pellets. We assume these measures to be possible to implement across much of the EU.

As I have explained, we also included emissions from the non-energy sectors of the economy: agriculture, waste management, some parts of the cement production process; and land use. With land use one may note that EU soils act as a net carbon sink, and a substantial one at that. The Swedish logging industry is hoping to benefit from this fact. However, our assessment is that the capacity for carbon sequestration in soils is nearing saturation, meaning we can

"A carbon tax would provide much greater incentives for all sectors to get moving; that should really be our first option."

Johan Rockström

not count on this sink to function with constant effectiveness until 2050. Already there are scientific findings indicating that this free ecosystem service is being weakened.

Although under our scenario significant cuts are made in the agricultural sector as well, it will continue to be a major emitter even in 2050. Thus, we do not consider it likely that the EU food production of 2050 will be carbon neutral.

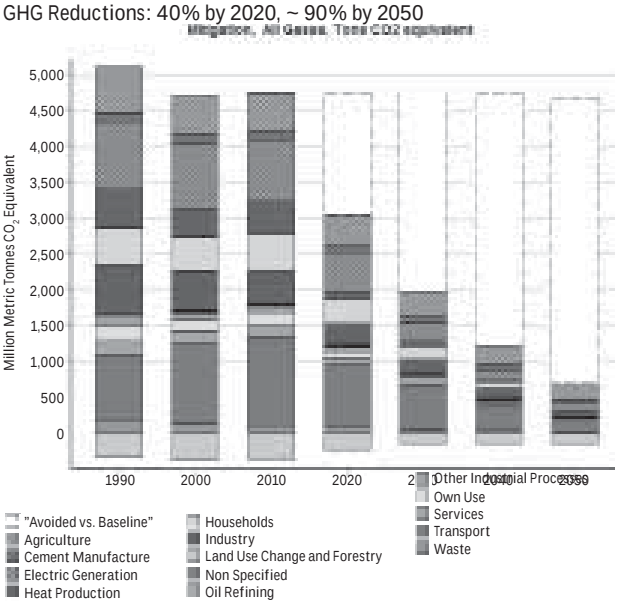
Electrification will present major challenges, given that there will be rapid growth in electricity demand from heavy industry, households, and above all from transport. The forecast of the IEA is that global electricity production will increase very rapidly all the way until 2050. In contrast, our EU scenario indicates that electricity use increases until 2030 and then stabilises; that nuclear and coal-based generation is completely phased out; and finally, that wind power sees growth that is absolutely tremendous, though still within reason.

This, I think, will be one of most-discussed findings of our report. For instance, in the UK more than 100 Gigawatts of additional wind generating capacity will be needed by 2050.

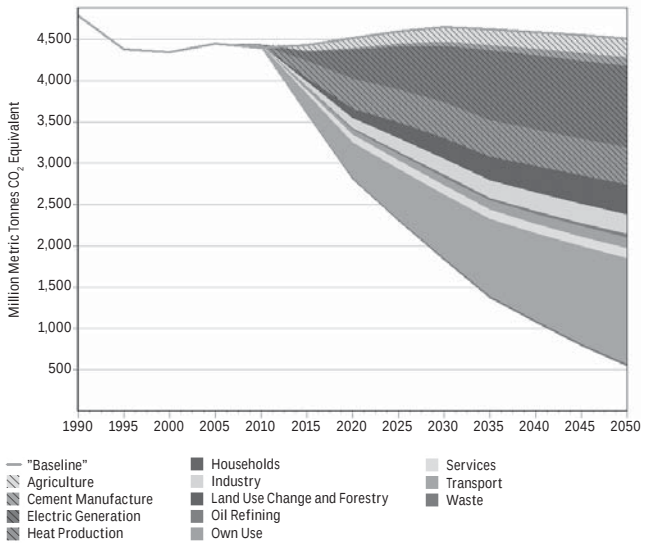
Now, returning once more to emissions reductions, can we draw any conclusions concerning this scenario? Unless there is a good deal in Copenhagen in which the EU assumes further strong leadership on climate change, EU emissions of greenhouse gases will remain more or less stable until 2050. In contrast, translating our scenario into climate terms, several key effects stand out.

First, EU emissions are reduced from 4.5 billion tonnes of carbon dioxide equivalents to 500-600 million tonnes by 2050 – an almost 90% decrease. Second, electricity production declines gradually, despite demand initially increasing very strongly. Third, drastic cuts in transport emissions means that this sector ceases to be a major part of the problem. And finally, there are very substantial increases in the energy efficiency of households.

GHG Reductions: 40% by 2020, ~ 90% by 2050



GHG Mitigation Wedges



The two graphs above show the possible emissions cuts in the EU, sector by sector. Source: SEI 2009.

In summary, we will be transforming our current societies into those of the future; and actually this transformation seems doable even with current information and technologies. We do not need to rely on large-scale expansion of nuclear power or on the scale-up of carbon capture and storage; though this is not to say that such technologies could not perhaps make an additional contribution.

Under business as usual, then, overall energy use will continue to increase until 2030, when according to the IEA it begins to stabilise. However, under our alternative scenario energy use falls rapidly; in particular, oil use is all but phased out by 2050. This leads to an emissions curve which over time matches the 2020 forty percent target quite nicely, and where unsurprisingly the reductions happen mostly within the industry, households, and transportation sectors.

Interestingly, on the level of the individual the implication is that we will be doing exactly what developing countries are demanding with increasing force: we will be reducing emissions from around ten or twelve tonnes of carbon emissions per capita and year, to perhaps a single tonne. Thus, if we are to achieve reductions of forty percent by 2020, and close to ninety percent by 2050we will end up at around one tonne per person and year.

Our analysis also assumes gradual convergence among the various countries of the EU, in stark contrast to the current situation where marked differences exist between rich and poor EU countries. I also wish to point out that even if all countries of the EU were to reach one tonne per capita per year by 2050, at this point there will be nine billion people on the planet; nine billion times one tonne equals nine billion tonnes of emissions, which in fact is roughly the size of our emissions today. As a result, the EU going it alone will not be enough to save the climate; all countries must make similar transformations.

Finally, what are the implications for economic growth? Our analysis indicates a cost of roughly one or two percent of GDP. This is a small sum relative to business-as-usual growth, equivalent to having zero growth during just one year single over a 25 year period,. This is more or less on par with the findings of the Stern Review, and is without a doubt a very low cost compared to the scale of the risks we face.We need to open our eyes to the benefits of moving in this direction, especially since we have the opportunity of taking the lead. Not surprisingly, in per capita terms, industrialised countries are still overwhelmingly responsible for carbon emissions. Our analysis looked at whether there is something to the argument that it is possible to reduce domestic emissions by forty percent over the next decade; and there is indeed.

Discussion

Question. Pontus Schultz. It is good to hear that the reductions are possible; but will they actually happen? What, in terms of policy, would we need out of Copenhagen to get started?

Answer. Johan Rockström. I think it is fair to say that Copenhagen will not deliver an agreement which makes such a transformation possible. This is worrying, as we really do not have much time to start moving in the right direction. In our view the main policy for driving change would be to put a global price on carbon; and here we believe there is potential for the EU to take the lead, introducing an internal price on carbon emissions.

Now, as you know we have already tried this with the Emissions Trading System; however, the ETS has proved a failure. 2020 is in any case not that far off. Thus, it would be wise to recognise that more effective policy instruments are called for at this point. A carbon tax would provide much greater incentives for all sectors to get moving; that should really be our first option. I also think that taxes could be implemented rather quickly. Probably, they should be supported by some manner of market mechanism; I think we could probably keep the carbon market in the future. Finally, we will need to institute a major fund for innovation and investment, not only at the global scale but within the EU as well.

"Governments need to actively promote emerging players whose solutions are in line with the common good, while punishing companies that seek profit at the expense of all other considerations."

Johan Rockström

Question. Pontus Schultz. On the subject of innovation, what do you think of the technical potential for the scenario you described? Can you see this happening?

Answer. Johan Rockström. I wish to emphasise that our analysis is wholly based on technologies which already exist today: there is a high likelihood of them becoming commercially viable over the course of the next decade. We have excluded fuel cells and other experimental technologies. Our analysis for 2050 likewise does not rely on any surprise breakthrough for its results; thus, it might be argued that it might be possible to go even further if such breakthroughs do emerge. Reaching forty percent reductions is not a matter of crossing our fingers and hoping for miraculous technological solutions. It is already clear that it is possible.

Question. Pontus Schultz. Over the last few years, the debate within the business community has shifted away from the rigid demand that no action on climate change must be taken unless the same rules are made to apply all over the globe. Today, the benefits of innovation are more generally recognised. And yet the debate among policy makers still seems largely centred on short-term competitiveness. What would you point to as the main arguments in favour of taking the lead?

Answer. Johan Rockström. The most effective way to change the minds of policy makers, I think, would be for heavy industry to come forward and stress that no globally identical price on carbon is needed; we could go forward without it. I agree that the excessive focus on competitiveness is in some sense about making excuses. Indeed, even today, when no global carbon price exists, neither does the alleged level playing field across global markets.

My other point is that it needs to be shown for the various regions of the world how going down the low-carbon path is in fact profitable. Not only is the EU is a very large market in itself; we have also shown that the costs of lowering emissions may be negative in the long term as new global market shares are captured. There is so much to indicate this; it makes no sense to wait until global policy is in place.

Ola Alterå
Comments and reflections

As State Secretary at the Ministry of Enterprise, Energy and Communications, I am not directly involved in the climate negotiations. This means that I am not responsible for what happens within the formal UN process with regard to the finer points of emission targets, percentage figures, and the like. Still, we are working together quite closely. The cooperation between the Ministry of Enterprise, Energy and Communications and the Ministry of the Environment has had to improve considerably during the current term of office; and of course, given the complexity of the climate issue, the Ministry of Finance obviously has a major part to play as well.

Our job at the Ministry of Enterprise, Energy and Communications is to make sure that climate policy is successful. Upon us will fall the actual implementation on the ground of whatever aggregated emissions targets are decided upon: expansion of renewable energy, changes to transportation systems, and the overall future development of the business sector.

We are also working actively to convince our colleagues within the EU and globally that, just as has already been said many times today, there are opportunities to climate policy. It is not just a matter of costs, problems, and economic constraints: there are possibilities for profits, competitiveness, growth, and green jobs. And Copenhagen will be central to furthering that agenda.

Now, I have a few observations to make: on the climate negotiations, on the scenario presented by Johan Rockström, and on the likely outcome in Copenhagen as well as the responsibilities of the EU.

My impression from the negotiations is that in many ways they are full of contrasts. On the one hand, the deadlock appears near-complete. To some extent this may be expected as a part of all negotiation processes, but it is a real problem

"There is no doubt in my mind that reductions of forty percent within the EU are possible."
Ola Alterå

nonetheless: the pace is slow, there is no agreement, and too few countries are truly committed.

And on the other hand, we know that all across the world pressure is mounting. Businesses are waking up to climate change, countries such as Japan and India are toughening their positions, and opportunities are being demonstrated. The overall momentum is growing as we speak, but has so far not been reflected in the negotiations.

The awareness on climate issues within Europe is quite high. There is lively debate, and a lot of work is being done by NGOs. As a result, there has been much focus on EU policies and commitments. There have been criticisms, no doubt justified in many cases, that our targets and positions are not ambitious enough.

Still, compare this to the situation in other parts of the world. The Americans have been unable even to produce a number for their emissions reductions. There has been no word whatsoever on financing commitments. Even getting them to repeat wordings from previous G20 summit statements, to which they subscribed at the time, is hard work; that is how cautious they are. Just imagine what it would take to convince them to take tougher positions.

Moving on to Johan Rockström's presentation, I agree that it seems like with every new scientific report released on climate change, the situation grows a little graver. The IPCC is in my opinion an extraordinary social and political innovation for providing consensus-based scientific guidance to policy makers. The irony is that arguably the IPCC system works too slowly. When finally we get to the part where decisions are to be made, already the underlying science is outdated.

Still, I discussed these frustrations with Mr. Pachauri when he last visited Sweden in person; this was six months ago. He said, and I think he had a point in this, that although the new science needs to be taken seriously there is also a risk that we jump to conclusions in assuming the situation is very much worse. He claimed that the 2007 IPCC report does cover all crucial issues, including the science of tipping points.

As a result, we need to resist the temptation of giving up on the IPCC process. If we stress too much only the latest scientific findings, we risk causing a backlash a few years down the road should it turn out that the dangers had in fact to some degree been overestimated. We risk undermining the credibility of the need for technological transitions which I am certain will be necessary regardless of the validity of recent papers. Also, there is no certainty that the German study mentioned by Johan Rockström is necessarily the final word on mitigation timelines; but that point is perhaps best left for a different debate.

In any case, I think it will be difficult to convince governments that having built up this international institution of the IPCC, we should now abandon it and move towards basing policy on our own ad-hoc assessments of the most recent science. That said, it is obvious that the IPCC needs some mechanism for producing more rapid updates on the state of science. I believe work is already being done in this direction; over the next decade policy makers will need to update their positions more frequently.

Now, concerning the scenario that Johan Rockström presented. There is no doubt in my mind that reductions of forty percent within the EU are possible. Speaking of which, in October I attended the biennial International Energy Agency ministerial meeting in Paris. Created after the 1973 oil crisis, the IEA is an organisation of the major oil-importing industrial countries, the energy agency of the OECD: it has historically been very much part of the fossil fuel economy. The IEA produces excellent statistics on all things related to fossil fuels as well as coordinates oil stockpiles in times of supply emergencies. Over time, it has also become quite involved with nuclear power.

Yet at the October conference, the analysis presented was a clear departure from the normal approach of 'fiddling the dials', as it were, of business as usual. Quite to the contrary, this was an approach similar to that of the Stockholm Environment Institute: what would be needed to stay below two degrees? Granted, their acceptable threshold was 450

"It is my conviction that taking the lead has not proved at all detrimental to the competitiveness of Swedish business. Quite the contrary, in fact."

Ola Alterå

parts per million CO_2e of atmospheric greenhouse gas concentrations, the same figure used by the IPCC; yet the overall thrust was to examine whether we can meet the demands of science.

And like many others, the IEA reached the conclusion that we can. Costs were deemed reasonable; in fact, the researchers found that local benefits and improved health conditions in cities might even result in overall zero or negative costs. And all of this coming from an institution which is very conservative, or at least hardly at the forefront of the climate issue. Again, this just goes to show how much momentum is really building.

Now, regarding the SEI scenario, without claiming to have seen all the numbers I feel that one might perhaps raise a few points. It seems to me that the assumptions made have the overall effect of excluding quite a few possibilities. No carbon capture and storage whatsoever is allowed; no biofuel use; and as I understand, at the same time nuclear power is to be fully phased out within Europe. One may question the wisdom of such an approach; still, there is no harm in trying out different scenarios.

But even with the constraints that SEI has defined, their conclusions on costs are broadly similar to most other studies, despite the fact that the technologies that are excluded usually feature much more prominently in other studies. One would expect costs to be at least somewhat higher under these rather significant constraints. Still, I suppose the main point is that these kinds of reductions are possible, and we will need to develop a range of strategies for getting there.

Moreover, I wonder if it is reasonable to expect all houses to become passive houses by 2050. Considering how long it takes for building permits to be renewed, making this happen seems like an enormous challenge to me. Still, perhaps the point is not really that each and every house needs to be a passive house; perhaps low-carbon district heating systems could still have a play to part under the SEI scenario.

On a related note, the mainstream scenario is that over the next four decades, the global economy will grow four or five times over; while at the same time the world population grows from six to nine billion people. Within our present economic system this equation just does not add up, which is why we need to move to a more eco-efficient economy. I am getting in the habit of bringing up this point whenever I meet with my European colleagues.

One way, I think, of addressing that challenge is related to the energy poverty of the developing world, which if alleviated would certainly affect population growth. In many of the least developed countries, families and particularly women may spend most of their waking hours gathering energy just for cooking. If simple and sustainable energy solutions could be made available in these regions, thus creating additional opportunities for education and development, experience shows that population growth will be affected as well. Thus, on the global scale population and energy are linked. This is a connection that I think is important not to overlook.

Next, what is the outlook for Copenhagen? Reaching an agreement which in all aspects is nationally and internationally legally binding: a treaty ready for ratification, where all technical details are finalised; this is looking increasingly unlikely. Although it was the original aspiration, I think most people are starting to look instead at the possibilities for a less formal agreement.

I think in any case that such formalities are of limited importance to the citizens and businesses of the world. And we may yet reach a clear political deal setting the framework and making it possible to retain a reasonable chance of staying below two degrees. Copenhagen alone will not accomplish everything we might wish, but it will set the course.

It will provide the policy space for governments to gradually take more ambitious action. It may also provide such momentum in the business sector that in the end we will find ourselves much more successful than we can imagine

today; this might even be how things are likely to turn out. Still, our greatest worry is that time is short, as Johan Rockström is correct to point out.

Going forward we will of course need a price on carbon emissions. To begin with, I think this will mainly be a matter of national discretion; whether it is done through cap-and-trade or carbon taxes is of lesser importance. But in the longer term, I would like to see the emergence of a global carbon market. I am all in favour of carbon taxes, but I think that for several reasons, global carbon trading is the more politically feasible option. Such a system might include developed countries as well as some industrial sectors of major developing countries: exporting industries that in practice are already part of the global economy.

Finally then, would it make sense for the EU to take the lead? Obviously, the first question to ask concerns the scale-up of the EU emissions target to thirty percent. As you may recall, the EU has pledged to unilaterally reduce emissions by twenty percent by 2020, but with the added guarantee that if a global deal is struck wherein other developed countries take on similar targets, this figure could then be raised to thirty percent. This means internal discussions within the EU on how much we require for going ahead with the scale-up.

The Swedish position is clear: we would have liked the EU's offer to reduce by thirty percent to be unconditional right from the beginning. But considering that not all EU members are pushing for ambitious climate policy, this issue of thirty percent will probably be difficult in and of itself.

When trying to assess the merits of leadership, let us examine the Swedish experience. We have all heard representatives of industry state their varying opinions on this matter. On the one end, the view is that taking the lead will mean rough times for Swedish business; and on the other, the prediction is that all companies will either close up or flee the country. Freezing cold and darkness is what awaits us, these companies will claim, if we press ahead and raise our carbon taxes beyond the level of other nations.

Looking back on our previous experience, though, it is my conviction that taking the lead has not proved at all detrimental to the competitiveness of Swedish business. Quite the contrary, in fact: thus have we laid the foundation for industrial partnerships, development, and growth. We are now in a position to benefit as the rest of the world makes the transition.

There a two ways of analysing this issue. We might take the neo-classical economic route, where the answer will always be to take action elsewhere and go for those solutions that are the most cost-effective in the short term, because that is how these models work. This is a point clearly made by Svante Axelsson, the executive director of the SSNC.

Or, we might take the longer view and look at strategic economic policy, in which case we find that positioning ourselves in anticipation of tomorrow is at least as important as going for the cheap option today.

Moreover, if the economic models used are designed in such a way that the time period under consideration ends in the year 2020, results will be skewed. After all, as we have heard several times this is a challenge with which we will be occupied until 2050 at least. Now, based on an economic model we may conclude that investment in high-speed trains is not profitable; but that will only be because the model considers no more than the coming decade. If instead we consider the entire period up until the year 2050, we will find that investing in trains is crucial.

Thus, although one must of course always take industry into account in economic policy, I do believe in taking the lead in a smart way.

Discussion

Remark. Pontus Schultz. 'Taking the lead in a smart way': arguably the most diplomatic phrase of the day.

Remark. Ola Alterå. And one that I will stand by. When you get right down to it, the real world is not black and white. I think many companies should be much more tightly regulated: at present they pay only a little in carbon taxes and are not at all affected by emissions trading. Still, even if

it were possible to raise taxes drastically overnight, perhaps even as a result of international negotiations, I doubt it would be a good thing in practice. In the real world, there will be trade-offs.

Question. Pontus Schultz. In the early phase, you said, every country will decide for itself what method of carbon pricing to pursue. But which countries do you think will actually implement such policies?

Answer. Ola Alterå. I am fairly certain that the Americans will do so. Though there is always uncertainty, the general feeling is that this is where they are headed. Thus, we try to suggest to them that their carbon markets should be designed so that it will at least be possible to eventually link it with the EU Emissions Trading System.

China and India will most likely take a different approach, relying more on regulation and other administrative solutions such as quota setting. In some sense, this also is a way of pricing carbon; albeit using a different kind of policy. But given time, I think there will be a global convergence around market-based instruments.

Question. Pontus Schultz. The climate issue is a large one, and fairly emotional as well. For instance, in 2007 there were reports out of Bali of people in the negotiations crying at the lack of agreement. Even without the US on board, will these aspects have any chance of affecting the outcome in Copenhagen?

Answer. Ola Alterå. Yes, I believe so; having just travelled across the Atlantic, I would say that this is true even in the US. The American leadership is promoting a powerful agenda of change which is having the unintended effect of mobilising opposing forces. It is somewhat disheartening to see the backlash of that counter-movement, with its strong opposition to health care reform as well as to climate legislation. Still, there is incredible drive and momentum in the US, and things are happening in research and business that are all too easily underestimated. And finally, I do think there is a real will to do the right thing by future generations.

Question. Pontus Schultz. You have made clear that you believe forty percent reductions to be beneficial to the Swedish economy; yet this view is hardly mainstream among policy makers in Sweden or internationally. What would it take for your insights to be more widely appreciated?
Answer. Ola Alterå. It is mostly a matter of framing the issue correctly. This is what I like about the work done by the SSNC: it is all about pointing to opportunities and promoting constructive debate.

Apart from issues of carbon pricing and technological development, there are also problems of a more institutional nature. For example, a degree of conservatism seems inherent in all trade associations; and every time these begin to close ranks to protect their most reluctant members, we need to find and encourage progressive forces within the business community.

At the international level we are constantly telling our story of this small Nordic country – an open economy, extremely export driven, very reliant on heavy industry, no fossil resources of our own – and yet we have managed to reduce emissions by one tenth while the economy has grown by fifty percent. In the end, what it boils down to is political confidence. "Yes we can", to put it simply.

Ahead of Copenhagen, the crucial thing will be to convince leaders that they need to attend and that they cannot afford a failure. Ministers of the Environment possess the will to act, but may lack clear mandates from their governments. Thus, in order to really push beyond the technicalities of the climate negotiations, leaders should go to Copenhagen. Admittedly however, it is currently highly uncertain whether they will find it worthwhile to do so unless they think that real agreement is possible. And if they do not come, the lack of commitment at the highest level may in itself thwart efforts to strike a deal.

Discussion on climate issues with representatives from the Swedish business community

Pontus Schultz, publisher at the business weekly Veckans Affärer, moderated a panel discussion with representatives of five Swedish companies that participate in the Climate Relay, an SSNC initiative to mobilise the Swedish business community in support of an ambitious and fair outcome of the climate change negotiations in Copenhagen (see pp 20-22).

– Up until November 2006, I think that the business community generally saw the environmental agenda as a threat; one that might lead to regulations or other restrictions on business activities, said Pontus Schultz in his introduction.

The Stern Review marked a turning point. Three years on, according to Schultz, climate change forms an everyday part of corporate strategy, and the speed with which this has happened is unprecedented. A survey conducted by Veckans Affärer after the onset of the financial crisis suggested that the shift is having a lasting impact among the 500 largest Swedish companies:

– Even in the middle of the financial crisis, forty percent of the five hundred largest Swedish companies responded that they would like Sweden to take the lead and implement tougher policies compared to the rest of the world. Seven out of ten thought that Europe as a whole should take the lead

Thomas Wallin is CEO of Veolia Transport, one of those five hundred companies:

- The first reason for our strong commitment to a future fossil-free society is that is that as responsible citizens, we too must do our part.

– Second, we have realised that acting on climate change will bring business opportunities for us if only we make sure to position ourselves wisely. But this is not a short-term consideration; our climate strategy is mostly a matter of positioning ourselves so that in ten or fifteen years we may benefit from ambitious environmental policy.

Also, according to Wallin, a multinational enterprise like Veolia cannot expect to do business with developing countries unless they are given the chance to develop without putting the planet at risk.

The Swedish travel agency Fritidsresor is also part of a multinational corporation, the TUI Travel group. For the company to have excellent environmental credentials is part of making sure that customers are satisfied with their vacations, said Bassam el Mattar, General Manager for Sweden.

– Also, in an industry with small profit margins, cost-effectiveness and optimal use of resources is essential to surviving in the marketplace. In such a business, environmental issues come naturally – it is a matter of getting maximum benefits out of a minimum of resources.

The Swedish Postcode Lottery is somewhat special in that it is a combination of a charity organisation and a commercial enterprise. In four years the lottery has in raised more than a billion Swedish Kronor (100 m€) for charity. Niclas Kjellström-Matseke, CEO, said that since most people act in accordance with 'rational' self-interest, rather than basing their purchases on what is climate-friendly or environmentally beneficial, companies need to take greater responsibility:

– They need to incorporate good causes into their products, so that in the end consumers are no longer faced with a choice between, for instance, consumption versus the environment. Environmentally friendly products should no longer be expensive niche products on a separate shelf. The environment should be integrated, not marginalised.

ICA and COOP, the two largest grocery chains in Sweden, both emphasised that they have been addressing environmental issues for decades, but that the focus on climate change has grown stronger in recent years. Both chains have set ambitious targets and adopted action plans for reducing their greenhouse gas emissions. But both also called for caution in the issue of climate labelling of food and other consumer products:

– In 2007, we carried out a major climate impact analysis covering one hundred of our products. Unfortunately, we reached the conclusion that climate labelling is more complicated than it might at first seem, said Lisbeth Kohls, Senior Vice President for Corporate Responsibility at ICA.

– We used to be cautiously optimistic about climate product labelling, but have grown much more sceptical, said Mikael Robertsson, Environmental Manager at COOP. For instance, within any climate labelling scheme there will be some bias toward locally grown food, to the disadvantage of poor exporting farmers in faraway developing countries.

The panel members presented somewhat diverging assessments of what importance COP15 will have for the business community and their respective companies.

– Our wish is for very clear commitments, said Lisbeth Kohls, especially considering that protecting the climate will be absolutely critical to securing worldwide food supplies. Crucially, the agreement needs to be ambitious enough to give us all a reasonable chance of staying below two degrees of warming

– A strong climate treaty is important because it would provide the private sector with clear sets of rules and with a framework within which to work, thus creating economic incentives for low-carbon alternatives, said Mikael Robertsson, Environmental Manager at COOP.

While he cautioned against overstating the important of Copenhagen, Thomas Wallin also made the point that in his organisation, goals of reducing emissions by ten or twenty percent "would actually be met with little enthusiasm":

– Only when we start discussing forty percent or more do we begin to see some real ideas and new perspectives emerging. At Veolia we have set the target of going completely fossil-free with the vehicles that we operate ourselves.

Niclas Kjellström-Matseke also pointed to the importance of what happens before and after the meeting, but added:

- It is very important to show to the world that there is unity of purpose: showing to the citizens of the world that a spirit of cooperation has prevailed. I believe that developing countries are waiting, and justifiably so, for us in the developed world to get moving and agree to tough positions ourselves before making demands on them.

Bassam al Mattar said that although Fritidsresor supports a global agreement, future action in the company will not depend on the outcome of the Copenhagen meeting. Moderator Pontus Schultz noted that many companies argue for a global agreement, or otherwise companies from countries that are covered by the agreement will be put at a competitive disadvantage. Was this a valid argument, he asked?

– I am not so sure, responded Thomas Wallin. I think that that with large industrial corporations the momentum is in any case already there. And in the end, there are only three kinds of companies: those that lead, those that follow, and those that stand on the sidelines wondering what just happened. I think the companies that stand to gain in the future are the ones daring to lead.

All the five companies represented on the panel participated in the Climate Relay that was initiated by SSNC. COOP, Ica and Fritidsresor has passed the baton to their competitors. Others have targeted companies that are closely linked to their business activities: the Postcode Lottery decided to send it on to the CEO of Posten, the major Swedish mail company, and Veolia Transport sent it on to the automotive industry:

– I think they are being much too passive. Indeed, one of the reasons why Saab, and perhaps Volvo as well, are having problems is that they have not positioned themselves.

Concluding remarks

Mikael Karlsson. Ola Alterå, you said there is no doubt that forty percent reductions can be done within the EU. We are then in apparent agreement. Thus, I wish to pass on the Climate Relay baton to you as a representative of the EU. If in any case we are to end up at ninety or one hundred percent reductions, we will need to pass forty percent at some point; and if so, why not by 2020, given how cheap and profitable it has now been shown to be? Please accept this baton, and make sure to pass it on.

Niclas Hällström. We are nearing the end of the 'Key Issues' seminar series; Copenhagen is looming ever larger on the horizon. At the SSNC, we are glad that you have chosen to make this journey with us; but it has been to our benefit as well. Indeed, part of the point with these seminars is for us at the SSNC to find our way around these very tricky issues. The climate problem is extremely difficult, complex, and political; and what is more, it touches on practically all other issues.

What lies in store in Copenhagen and beyond? What needs to happen? How can the SSNC, being a major environmental NGO, contribute? What issues should we focus on? The Key Issues seminars have been about finding good answers to all of those questions. And they have paid off, I think. The SSNC now hopes to be quite well equipped for making a real impact in Copenhagen. At our next seminar, just ahead of Copenhagen, we will summarize the seminar series on the Key Issues for the Climate.

Participants

Ola Alterå
is State Secretary at the Ministry of Enterprise, Energy and Communications in Sweden. His background includes studies in Engineering Physics at Chalmers University of Technology. As Secretary General for the Centre Party, Mr Alterå initiated a reform process in terms of politics and organisation. In order to put into practice one of his core interests, Renewable Energy, he then moved on to a position as the Managing Director of the Swedish District Heating Association. As of 2006, he holds the position as State Secretary with responsibility for Energy, State Ownership Policy, Primary Industries and Sustainable Development.

Emma Lindberg
Emma Lindberg works on climate policy at SSNC with a particular focus on Sweden and the EU. In addition to policy and advoacy work, she has coordinated the SSNC 'Climte Relay' where 212 CEOs of small and large companies have endorsed strong demands on politicians, and challenged their peers and competitors. Prior to joining SSNC, she worked as assistant to Member of the European Parliament Anders Wijkman in Brussels and prior to that as Environment Manager for HP Sweden for four years.

Dr. Rajendra K. Pachauri
has served as the chair of the Intergovernmental Panel on Climate Change (IPCC) since 2002. His involvement with the work of the IPCC stared more than a decade earlier, in 1991, when he was the lead author of the Panel's Second Assessment Report. Dr. Pachauri represented the IPCC at the Nobel Peace Prize awards ceremony in 2007, when IPCC shared the prize with former US vice president Al Gore. Born in Nainital, India, Dr. Pachauri is also Director General of TERI, an Indian research and policy organization. He holds two PhD degrees, one in industrial engineering and one in economics.

Johan Rockström
is Director of Stockholm Environment Institute (SEI) and of Stockholm Resilience Centre (SRC). Under his administration, SEI has brought several important elements into the climate negotiations. SEI has shown that recent science necessitates setting more ambitious objectives. In addition, it has developed an influential model – the Greenhouse Development Rights (GDR) – for assigning responsibility for effort sharing on climate change action while accommodating the right to development of poor people.

Panelists from the Swedish business community

Niclas Kjellström-Matseke, CEO, the Swedish Postcode Lottery
Lisbeth Kohls, Senior Vice President Corporate Responsibility, ICA (a leading grocery retail chain)
Bassam el Mattar, General Manager for Sweden, Fritidsresor (part of TUI Travel)
Mikael Robertsson, Environmental Manager, COOP (a leading grocery retail chain)
Tomas Wallin, CEO, Veolia Transport

Concluding remarks

Mikael Karlsson is President of the Swedish Society for Nature Conservation (SSNC)
Niclas Hällström works as expert on climate at the SSNC International Department.

Moderator

Pontus Schultz
is Publisher Veckans Affärer, a Swedish business weekly

Glimpses from the Climate Relay – CEOs asking the EU to achieve a powerful Copenhagen agreement

Since May this year, the Swedish Society for Nature Conservation has been running the campaign "the Climate Relay". Its purpose is to support the Swedish government, acting as the EU president, to act in an ambitious way in Copenhagen and to ensure that:

- the industrialized nations by the year 2020, together reduce their greenhouse gas emissions by at least 40 percent from their 1990 levels; and
- the industrialized nations substantially strengthen their support for climate investments, in addition to aid, in developing countries.

212 CEOs have participated in the Climate Relay, and CEOs who support these requests have passed on the batons to other CEOs. In addition to internationally well know brands like IKEA and Coca Cola, participants include many of Sweden´s leading companies in a wide range of sectors: international manufacturers, banking, insurance, construction, energy, retail, hotel, travel industry, grocery chains, fashion companies, business magazines, media etc. The full list of participating companies can be found at www.naturskyddsforeningen.se/climaterelay.

During the year the Swedish Society for Nature Conservation has held several dialogues with CEOs and local politicians on the expectations for Copenhagen. They have said that a powerful Copenhagen agreement that meets the two requests of the Relay is good in economic terms. It is cost efficient to take action now rather than wait, but the right political framework is needed. Many of the companies have also set ambitious goals to cut their emissions within only a few years, cuts that countries give themselves a lot longer to meet.

The Climate Relay between CEOs has been complemented by activities among ordinary citizens. The climate baton has travelled through large parts of Sweden by bike to raise awareness of solutions to the climate crisis. As the Climate Relay travelled through Sweden, thousands of citizens and several EU environment ministers participated in a Climate Quiz on Copenhagen. Close to hundred local governments leaders have also participated in the Climate Relay. When the former press secretary the minister for the environment accepted the climate baton, he passed it on to the King of Sweden (!).

On December 1st, the climate baton was finally handed over to the Swedish government and the EU presidency.

EU commissioners Margot Wallström and Stavros Dimas also received climate batons as an encouragement to remember the needs of the planet, and as a reminder that there is strong support among CEOs for a lot higher targets in Copenhagen.

"NCC works since many years to decrease the negative environmental impact from the construction process by creating climate smart products and decrease the energy use in our processes. In order to stop climate change and its consequences to society we all need to contribute. Therefore it feels natural to us to participate in the Climate Relay by supporting the requests ahead of Copenhagen."

Tomas CArlsson, CEO, NCC Construction Sweden (one of Sweden's largest construction companies)

”The climate change issue is without any doubt one of the biggest challenges in our lifetime. It is absolutely critical that the political leadership around the world unite to tackle and resolve this issue in a manner which is speedy, effective and fair. (…) Failure to reach an agreement is not an option.”

Tom Johnstone, CEO, SKF

Swedbank, one of Sweden´s largest banks, signs on in support of the two requests of the Climate Relay.

IKEA, the former press secretary of the environment minister, and other CEOs and local politicians passing on the climate baton.

Bulan Eriksson, CEO and former Olympic Super G medallist, and participant in the Climate Relay, skied on grass to draw attention to the climate change that is already happening.

Andreas Carlgren, Minister for the Environment, does the Climate Quiz.

”As a travel company: what would it not mean to our future if today´s travel destinations sink in rising seas, are destroyed by uncontrolled forest fires, are blown away in constant hurricanes, are flooded in unnatural or simply dry away due to lack of access to water?”

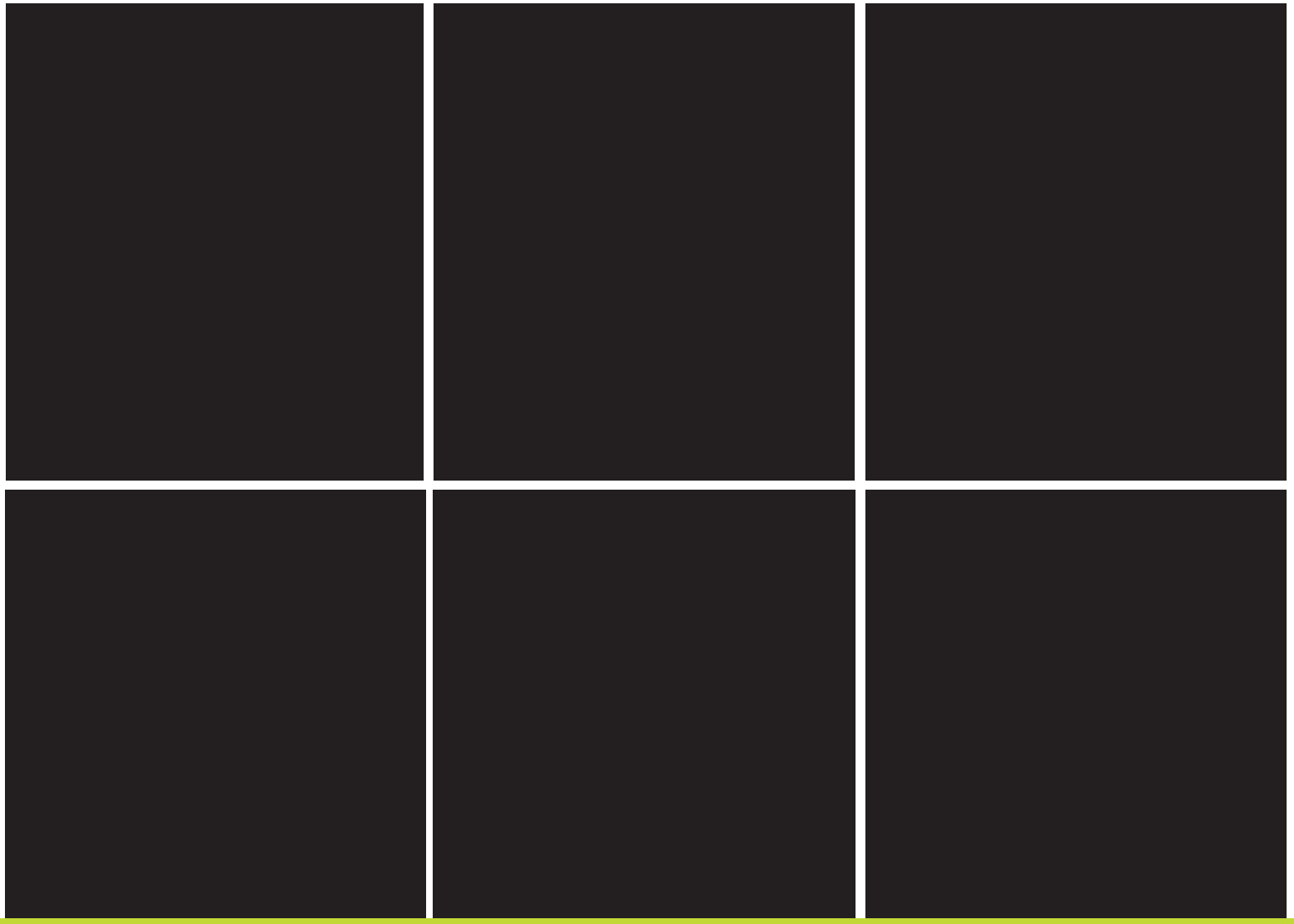
Bassam el Mattar, CEO, Fritidsresor (part of TUI Travel)

EU commissioner Dimas is given a climate baton as encouragement to the EU to raise ambitions.

The climate baton is passed on to the EU presidency by SSNC in the company of several of the CEOs.

“We know that everything we do has consequences to our surroundings and we must therefore always think about the sustainability perspective. We want to support the Climate Relay because we are convinced that together we are able to reach demanding climate targets. I pass on the climate baton to IKEA Denmark.”

Jeanette Söderberg, CEO, IKEA, Sweden



Seminar report from Seminar no. 8:
Patents – barrier or support to save the climate?

How to enhance the access by developing countries to new and climate friendly technologies is one of the most contentious issues in international climate change negotiations. At the core of the controversy is the issue of intellectual property rights (IPR). Are patents really necessary for innovation? Will strong protection of intellectual property rights hamper the possibilities to transfer climate friendly technologies to developing countries? Who is gaining and who is losing from the present IPR regime?

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues8

Participants: Emilie Anér, Swedish National Board of Trade, Fredrik von Malmborg, Swedish Ministry for Enterprise, Energy and Communications, Pat Mooney, ETC Group.

Moderator: Krister Holm, SSNC Project coordinator: Niclas Hällström, SSNC Summary by: Göran Eklöf The seminar took place: 4 December 2009, Kulturhuset, Stockholm Layout: Espmark & Espmark Printing: Stockholm March 2010
www.naturskyddsforeningen.se/keyissues

Produced with financial support from Sida. Sida did not participate in the production of this publication and holds no position on the opinions contained therein.

Patents – barrier or support to save the climate?

Niclas Hällström

The Copenhagen meeting will start in only two more days, and we thought we should squeeze in one last, extra Key Issues seminar in our series. We will bring up one additional issue which is central, and although it has been touched upon a few times in earlier seminars it deserves a session of its own. The issue is that of ownership of intellectual property and patents. And this is timely: for example the largest Swedish daily newspaper Dagens Nyheter carried an big article only a few days ago, concluding that one of the big battles in Copenhagen will be in intellectual property rights.

The second part of the seminar will be devoted to a wrap-up of the issues that have been discussed in this series of seminars, and to look ahead at what is likely to happen in the next few weeks.[1]

I will now hand over to Krister Holm, who is working on trade and environment at the Swedish Society for Nature Conservation (SSNC), who will be moderating the seminar.

Krister Holm
Introduction

It is good that we could pull together this last seminar on intellectual property and access to technologies for developing countries. I just came back from a World Trade Organisation (WTO) meeting in Geneva, and although the issue was not officially on the agenda, it was discussed in a lot of seminars. Some of the texts on which the negotiations in Copenhagen will be based touch on intellectual property rights (IPRs), patents and access to technologies.

I am happy that we could get our resource persons to come at short notice. Our first presenter is Emilie Anér from the Swedish National Board of Trade. She is an expert on these issues in the context of WTO, but also in regional and bilateral free trade agreements. We also have Fredrik von Malmborg, who is Head of Section in the Energy Division at the Ministry of Enterprise, Energy and Communication. He is currently the coordinator and issues leader on IPRs and climate technology transfers for EU in the climate change negotiations. Finally, Pat Mooney is from the ETC Group, a civil society organisation involved in research, analysis and advocacy on issues relating to technology, environment and development.

I now invite Emily to give her presentation.

Emilie Anér
The relationship between intellectual property rights and technology transfer

The Swedish National Board of Trade (Kommerskollegium) is the government agency for trade and trade policy. We do studies and analysis mostly for the Ministry for Foreign Affairs. I will be covering the relationship between IPRs and transfer of technology, and come in a little bit on climate technologies towards the end.

But first a little bit about the reasons why there is such a thing as intellectual property. This is to correct a failure in the market: if there is no way to prevent others from copying your ideas, there will not be enough production of new knowledge and inventions. IPRs is thus a 'second best' solution – it would be best if people would innovate anyway. The system of patents for innovations, copyright for artistic work, designs and many other types of intellectual property rights has been created in order to allow people who develop new ideas or create new work to reap the benefits from their investment and thinking. An important point is that this will stimulate private innovation of products for which there is a potential market and other enabling factors – IPRs in themselves will obviously not stimulate innovation.

1. The wrap-up session is not covered in this report, but a summary of SSNCs views an positions is available (in Swedish) at http://www.naturskyddsforeningen.se/upload/foreningsdokument/klimat/synpunkter_kopenhamn_7dec.pdf See English version in this compilation, p. 193

"If there is no way to prevent others from copying your ideas, there will not be enough production of new knowledge and inventions."
Emilie Anér

An IPR is an exclusive right given to the creator, but it is not absolute. There are always exceptions and limitations involved: limited time (usually 20 years for patents), allowing of copying for private use and a number of other limitations. If you look at the IP system of a country, a proper balance should always be maintained between protecting the rights and interests of the creators of intellectual property, and those of users and of society at large, so that everyone benefits and thinks that the system is reasonably fair.

Transfer of technology is a really difficult concept to wrap your head around, and there is no international definition of the concept that I am aware of. It can be seen as the flow of knowledge from one human to another. It is not only that technology is given or put somewhere – someone has to receive it, adapt it, use it and understand it. The role of the recipient is thus really important.

Transfer of technology is difficult to measure, and usually it is the channels for transfer that are measured. There are many such channels: trade in products and services that embody a lot of technology, foreign direct investments (FDI), licensing and other market channels. There are also non-market channels such as migration, when somebody relocates and starts up a new business or to participate in a research project. And, of course, plain imitation: you see something and you copy it. All these this can be measured, but it is difficult to measure when the actual transfer takes place: when does the recipient actually understand and use the technology?

Many factors other than IPRs influence these channels: political systems, market structure and size, trade and investment regimes, and a lot of other policies.

Theoretically, stronger IPRs can both stimulate and be an obstacle to transfer of technology. The positive effect is called the 'market expansion effect'. This is where a rights-holder in one country feels that another country has a system for protecting patents and copyrights, and feels secure in cooperating with that country or investing in that market. The negative effect, which is called the 'market power effect', comes from the fact that an exclusive right is exclusive: if there are no similar products available on a market, this may lead to a monopoly. Monopolies can be exploited for raising prices, or for restricting access by not selling on a particular market. In this way, stronger IPRs can have the effect of reducing transfer of technology. Other possible effects of effective IPRs may be that companies decide to licence rather than to invest.

This, as I said, is the theory. But what happens in the real world? A very large empirical study from the OECD, published in 2008, measured the effects on IPRs on transfer of technology and tried to see the effects on local innovation. It found that stronger patent rights are associated with more incoming FDI and more imports of goods and services – especially high-tech products that contain more technology. Strong patent rights are also associated with more patent applications and more expenditure on research and development (R&D) locally. The study finds the same correlation in all countries – developed, developing and least developed countries (LDCs) – but it is much stronger in developed countries, while for LDCs it is quite vague.

One general conclusion to be drawn from this and many other empirical studies is that the role of IPRs depends on the technological content of a product or service – FDI for products that are very sensitive to IPRs are stimulated more by stronger patent rights than FDI that is motivated primarily by low labour costs. The level of development of the recipient country also matters, as the role of the recipient is important. For developed countries and developing countries with technologically advanced societies, IPRs will stimulate both local innovation and transfer of technology. But for LDCs and countries on a similar technological level, IPRs do not necessarily constrain transfer of technology, but other factors like education, infrastructure and market size matter so much more.

Regarding climate technologies, they can be practically anything related to the reduction of greenhouse gases or adaptation to a changing climate. A large number of studies

"For LDCs and countries on a similar technological level, IPRs do not necessarily constrain transfer of technology, but other factors like education, infrastructure and market size matter so much more."

Emilie Anér

have been presented during the last years. You can see a strong increase in patenting, especially in alternative energy technologies, mostly in developed countries but also in some developing countries – notably China. But at the same time, patents will have a 'market power effect' if there are no other similar products on the market to compete with. But particularly in the alternative energy sector there is quite a lot of competition, because basic technologies are often rather old (like in solar cells) and can no longer be patented. There may be many improvements and adaptations that can be patented, but they tend to compete with each other.

And then, of course, to mitigate climate change you can use any number of technologies and strategies, so the different technologies also compete with each other. This means that there is generally very little room for monopoly pricing or behaviour – not at all like in the pharmaceutical sector, where it is quite easy to get a world-wide monopoly for a new medicine for a particular disease. But as climate technologies is such an incredibly wide area, it cannot be denied that there may be technologies for which IPRs can be a constraint to transfer of technology. We also don't know what type of technologies will be important in the future.

It is important to have a nuanced debate and look at the specifics. But if you look at the kind of problems that may come up – monopoly pricing, patent owners that block further research in an area, or 'patent thickets' that makes licensing and use very difficult – these problems can be handled within the framework of the current IPR systen, and you do not have to overhaul the entire system. This is the conclusion we came to when the National Board of Trade looked at these issues. The WTO agreement on trade-related intellectual property rights, TRIPS, contains more flexibilities to handle these types of problems that what is actually used by most countries today.

I will stop there, but will be happy to answer any questions that may come up in the discussion. Thank you.

Pat Mooney
The problems with patents

First, I thought that was a very balanced presentation by Emilie, and I appreciate it very much. I still, however, argue that IPR protection in the context of climate change, and quite frankly in almost any other context, is a detriment to innovation and a barrier to progress. My second preliminary comment is that when you hear discussions taking place in Copenhagen next week and the week after, probably the one area of progress that you will hear about will be in negotiations around technology and technology transfer. There will be one announcement after the other from world leaders about their commitment to new technologies to help us get through climate change – in fact we've already heard a lot of that in the last several days. I think that bragging will be false, and they will talk about technologies that are actually in some cases quite dangerous. The details about those technologies probably will not be discussed, I presume. But even that is changing. Last week, the initial chair of the Intergovernmental Panel on Climate Change (IPCC) announced that technology was going to be a key issue in Copenhagen, and that we have to look at "Plan B" for dealing with climate change. This is about 'geo-engineering', a topic that was discussed in this series of seminars a few weeks ago.[2] And only a few days we heard the current chair of the IPCC say that there also has to be a major discussion about geo-engineering. My prime minister in Canada is saying the same thing, and there are similar statements from the Obama administration.

I know this is not the topic today, but think about this when you hear the statements coming from Copenhagen. You will have leaders from OECD countries – who for decades have tried desperately to avoid the issue of climate change and done a terrible job of dealing with the problem in their own countries – coming together now and saying that they can't convince their societies to change in any way

2. See www.naturskyddsforeningen.se/keyissues for the full documentation from the seminar on Technology and Climate.

"So under a single patent claim you have an effort to control the entire food supply. It is absurd, but the patents are still there and the battle to turn them around could be enormous."

Pat Mooney

near to mitigate climate change. But we can change the sun's impact on the planet. We can fundamentally change the thermostat of the planet trough some kind of geo-engineering. If you really believe our governments are capable of doing that, but not capable of getting us to take buses, then we have a problem!

I will argue now that IPRs are severely detrimental and in fact dangerous in the context of climate change, and I will put it particularly in the context of agriculture. There has been a major pressure already by major companies to control what are called 'climate ready crops'. I will quickly remind you what has happened on IPRs in agriculture over the last few decades.

Today, about 82 percent of all plant varieties that are commercially used have some kind of intellectual property protection around them. Just ten companies control 67 percent of all those varieties, and three of those companies control more than 50 percent. That's different from in the 1970's when there were some 7,000 companies involved in plant breeding and no single company had even ½ percent of the intellectual property protection.

Now, what have they given us over that time? Consider that because of climate change we need to have massive diversity in species and varieties of plants and animals, and a lot of innovation to adjust our crops and our livestock to conditions which we can't even imagine. But the companies that have now taken over control of livestock and plant breeding have done the opposite of that. There are, for example, 5,000 domesticated plant species that are grown every year. But these companies are only involved in 150 of those species, and almost all of their work is only in 12 species. This is an incredible narrowing of what we could be working with – there is just no interest in the rest. And 59 percent of all varieties that have plant variety protection in Europe are ornamentals, which will make your dining table look nice but has no importance for the food on the table. There are as many cases of IPR protection on roses and chrysanthemums as there are for wheat, rice and maize combined. So has this kind of control over IPRs led us to anything that is going to help us confront climate change in the years ahead? I don't think so.

At the same time, if you look at what farmers in developing countries have done over the same time: farmers are working with 5,000 different plant species and 1.9 million distinct and named plant varieties which they have also donated, freely and without intellectual property protection, to gene banks. The total number of plant varieties available from the IPR system is 72,500. So which one are we going to depend on more, which one is going to get us through climate change more effectively?

The same pattern can be seen in the livestock breeds that we will have to depend on. The six dominant companies only work in five species, and that includes goats where very little work is being done. On average they work with only five breeds in each of those five species – that is extraordinarily narrow! But there are 40 domesticated species of livestock, and 8,000 different breeds where the only work being done to protect them is done by peasant farmers around the world. If we are going to survive the changes that are ahead of us we will need those 8,000 breeds, and we will need all 40 species. But there has been no interest in the IPR system to move into these areas – in fact there was far more work there by the companies in the past thanthere is today.

The same is also true for aquatic species. Fisherfolk around the world work with 15,200 freshwater species. The industrial system uses 336 freshwater aquatic species. Again, if we want to have diversity in the future, we need to work with a much wider range.

But it is not just that the IPR system has narrowed the food base and concentrated control of it. They are now claiming monopoly over the food base in a way that they never have in the past. In the last few years we've seen a movement towards 'climate ready crops', and the same development in terms of livestock. In crops we have six companies who, often in combination, claim that they are going to get us through climate change. These companies

"We need to find ways to create innovation between the public sector scientific community and the innovative research that is being done by peasant farmers around the world "

Pat Mooney

are: Monsanto, DuPont, Syngenta, BASF, Bayer and Dow. Most of the work is done by Monsanto and BASF working together. They have developed some 55 patents and claim large chunks of DNA that they say exist in virtually every known plant species – they are common in everything from rice to roses, banana and coffee. They now say that this DNA belongs to them, and that the use of that material to deal with any form of stress in plants would be a violation to their patents. The patents actually claim that these strands of DNA that they have discovered make the plant drought tolerant, salt tolerant, cold tolerant, heat tolerant, and much more – sometimes all under one patent claim!

So under a single patent claim you have an effort to control the entire food supply. It is absurd, but the patents are still there and the battle to turn them around could be enormous.

What they are actually doing is not to get us ready for climate change, but trying to control biomass. We have moved from a world where companies are actually trying to grow food to feed one billion hungry people to one where they are converting biomass to either food or fodder, or fuel, or plastics, or electricity, or whatever. And their claims on those chunks of DNA are just to do that. They have no idea what they will be able to do with it, all they know is that it is common to all species.

Can we get the kind of flexibility that we need from that intellectual property system? I say we can't. If you talk specifically about the Union for the Protection of Plant Varieties (UPOV), it requires any protected variety to be distinct, uniform and stable. The last thing you want in a world of climate change is uniformity! What you need to be doing is breeding for the opposite. With the shocks of climate change and an increase of extreme weather conditions, you need the most diversity that you can possibly have in the field, all the time.

In fact, in the context of climate change, UPOV must be abandoned. It is simply a risk to our food security. Then we need to review the patent system more broadly to see if it has more of the same threats. And it certainly does in the context of the climate ready crops that are being developed by Monsanto, BASF and the others. They are too dangerous. We need to find ways to create innovation between the public sector scientific community and the innovative research that is being done by peasant farmers around the world, so that we are using the 15,200 freshwater species, the 40 livestock species and the 5,000 domesticated plant species to make the adjustments that we need to make.

Fredrik von Malmborg
The EU's position on IPR in the climate negotiations

I will present some of the EU's positions and views on the negotiations related to IPRs and patents. First of all, I would like to thank Pat for bringing up more specific technology areas in the discussion, because so far the negotiations are taking place on a very general level. It might seem like a paradox, but the technology negotiations do not discuss specific technologies, neither for mitigation nor for adaptation. The only specific technologies that are discussed are related to the Clean Development Mechanism (CDM)[3] and the methodologies for approving crediting of emissions reductions.

I would argue that the discussion about IPRs has, to some extent, been lifted out of its context. What the negotiations are about is technology transfer. The issues of IPR and patents are introduced in the discussions about how to enhance technology transfer, and the development of technology, and in that setting IPRs have been argued to be one of the barriers. I would also argue that much of the studies looking at IPRs and technology transfer isolate IPRs

3. CDM is one of the 'flexible mechanisms' under the Kyoto Protocol. CDM makes it possible for states or companies that have emission reductions commitments to meet them, in part, by investing in emission reduction projects in developing countries that have no such commitments.

"If the proposals made by developing countries were accepted, there would be a risk that investors would direct investments into other areas than climate technology innovation."

Fredrik von Malmborg

as an issue, and there are very few studies that actually focus on the total set of barriers to technology transfer. This results in a somewhat skewed picture of what are the real barriers.

It is developing countries who claim that IPRs is a barrier to technology, while developed countries are contesting it. But it is never discussed in what context, and for which technologies, and on what grounds they are making that argument. In the negotiations, no arguments are presented for why IPRs should be a barrier.

The proposals being made for addressing IPRs in the negotiations are actually some of the most provocative ones. In the negotiating text you can find proposals for the revocation of all existing patents, mandatory exclusion from patentability specifically and only for companies in developed countries, systematic royalty-free compulsory licensing of climate technologies, and pooling of all IPRs. As we approach Copenhagen the issue or IPRs is not only raised in the context of technology transfer, but references to IPRs as a barrier can be found also in the texts on shared vision, on financing and on mechanisms for mitigation. And, these claims and proposals are not addressing any specific technologies, but they are being made in a very general way with reference to all kinds of climate technologies.

Coming back to the question on what grounds developing countries argue that IPRs is a barrier: one of the mechanisms that has been introduced in the current climate regime is technology needs assessments, where developing countries assess and prioritise their needs. They also identify the barriers to technology transfer. So far the assessments that have been produced have hardly been used at all. The UN Expert Group on Technology Transfer is now looking to helping countries develop projects that can be financed and to match investors with such projects. The EU is now proposing that these technology needs assessments should be integrated with our proposals for Low Carbon Development Plans or national adaptation planning, and tied into the system of support for mitigation and adaptation.

But if you look into the technology needs assessments, and the barriers identified, in the 2006 needs assessment the parties listed economic and market related barriers together with institutional barriers as being the most important ones. Within the economic and market related barriers part, in all the needs assessments produced IPRs was only mentioned as a barrier in one case. In the 2009 synthesis of the technology needs assessments, there is no reference at all to IPRs specifically, although it could perhaps be seen in relation to the 'monopolistic utility models' that are mentioned. As IPRs is not identified as a barrier to technology transfer in the assessments made by developing countries themselves, the argument that IPRs is a strong barrier must come from somewhere else.

Question from audience: What about high costs?

High cost is related specifically to state resources. Lack of financial resources and high investment costs are mentioned in the 2006 assessment, but if you look at the kinds of technologies that they identified, licenses are a very small part of the total costs of investments. Specifically for mitigation, where you have a lot of competing technologies, the cost of licensing is usually very small.

From an EU perspective we think that IPRs are fundamental for technology transfer and development. They incentivise investments in commercialisation and diffusion, and this is the argument that is most often made. But you can also see that the publication of patent applications makes information about new climate technologies publicly available, and then it is usually the lack of absorptive capacity that presents a greater barrier.

You often hear in the negotiations that least developed countries should be exempted from patents, but the current IPR regime already admits special treatment for developing countries. Patent holders can differentiate between countries in their price setting. We also see that new climate technologies can be exploited freely in countries without

patent protection, so we don't see the validity of the claims made by LDCs.

You could also ask for what purpose a license is to be used by developing countries. There have been claims by certain kinds of developing countries that every country should have the possibility to manufacture the technologies that they need domestically. This neglects international trade, and the possibilities to buy the technologies you need from companies abroad.

From an EU perspective, it would be counterproductive to undermine the IPR regime. If the proposals made by developing countries were accepted, there would be a risk that investors would direct investments into other areas than climate technology innovation. As a result, the development, commercialisation and diffusion of such technologies would decline. This could reduce the chances of actually obtaining the necessary long-term mitigation and the overall objectives of the climate convention.

Panel conversation and interaction with the audience

Comment. Krister Holm, moderator. We have heard some very different opinions on patents. From the last presentation it may seems like a mystery why it is such a big issue for developing countries to propose more flexibility and more access to technology, and why IPR issues appear in so many parts of the negotiating text. Yet, the controversy is a fact. Let us penetrate the issue futher through interaction by the panelists and comments from the audience.

A report from Global Humanitarian Forum has tried to assess the effect that global warming has today on human health, and they find that 300 million people are severely affected, and 300,000 people have died this year due to global warming. This is a very serious situation. In other serious situations, such as during Word War II, patents were suspended because the authorities at that time saw them as barriers to moblilising all the resources of the country to fight the enemy. So, it seems like patents have some kind of role in responding to emergencies. Are we in an analagous situation today?

Obviously, there is a cost associated with patents, and they do make the price of products a little bit higher, while we need to reduce the costs as much as we can for developing countries. But, let's get deeper on the fundamental issues.

Comment. Pat Mooney. I appreciate the presentations, but I think that some of the arguments we have just heard for the patent system haven't been believed for decades now. I don't think patent lawyers any longer believe the argument that the publication of a patent shows you how to make the invention. It has not been true for a long time. Every effort is made to hide the actual innovation in a patent claim, and that is the problem of 'patent thickets' that we did have reference to. It is not really possible to sort your way through them, and they are designed for that purpose. That patents really encourage innovation is also easily disputed. What you have is that a group of companies in, say, the seed industry will come together and simply swapping patents. They have an exchange of intellectual property agreement amongst themselves that keeps virtually everybody else out. And this is not a matter of cost, it is the fact that you can't get in to do more innovation. In the example of soy beans, Monsanto had a patent on the species for 14 years. It was an absurd patent, which was finally overturned. But they had it, and even though they knew that the patent would eventually be overturned, no-one else did research on soy beans for 14 years. Research in that crop just vanished because of the monopoly.

Question. Krister Holm. Is it a myth that strengthening and enforcing IP laws actually promotes innovation?

Answer. Pat Mooney. Absolutely!

Answer. Fredrik von Malmborg. In order to find solutions to these problems you have to discuss very specific technologies and cases. As the issue is disused in the negotiations it is on a very broad level, but I am sure that you can find specific technology areas where patents actually might be a problem. Most of the studies being made are on mitigation technologies. With regard to the examples in agriculture that have been mentioned, they relate to adaptation. There is adaptation on many different levels, and most measures are related to management and administrative issues. It is difficult to speak of technologies for adaptation. But from finding specific cases to claiming that you need general solutions to the IP system does not really make sense. And, then you need to ask whether the climate convention is really the right place to discuss these specific cases. For agriculture you have the FAO and other fora.

Question. Krister Holm: If you look at where all IPR issues are negotiated and decided, it is in the trade negotiations: in the WTO, and in bilateral or regional free trade agreements. And I believe the different views that we can see in the climate negotiations can also be seen in the trade negotiations. Emilie, would you like to comment on that?

Answer. Emilie Anér. This is very much a North/South issue in trade as well. The TRIPS agreement has a number of very strong minimum rules for everyone, except for the LDCs who have a transition period before they need to abide by these rules. But there are also some areas that are not very specific at all. For patents there are a number of flexible rules that allow countries to have national systems that are different from other systems. Then there is a provision that you must allow patents for microorganisms, but microorganism are not defined, and this is a research intensive area where the boundaries change all the time. So what happens is that countries apply their own definitions. In the EU, for instance, microorganisms include genes and cells, so you can have patents for gene sequences or cell lines if they are isolated from their natural environment and there is a practical use for them. But in many countries genes are not considered to be microorganisms. So you don't have to provide patent protection for genes, plants or animals. For plant varieties countries have to provide some form of effective protection, but it does not say it has to be patents or protection under the UPOV convention that Pat mentioned – you can have some other system that you consider to be effective. So there is quite a lot of room for manoeuvre, but this is not very much used today. Many of the discussions around TRIPS, and most specifically on medicines, have already moved past the general statements that IPRs are generally good or bad. But now we are coming back to this black-and-white view.

Comment. Pat Mooney. I think this generic discussion about technologies and IPRs that is taking place in the Copenhagen context is dangerous. The discussion has to be specific. It is not only about the South proposing some thins that is of concern, but the North is insisting on generic protections. Both sides are being rather general, perhaps, but the *general* defence of IPRs and of the technology regimes that exist is a threat to food security and to all our future in responding to climate change. So, it is not only one side that is taking broad positions on this issue – both sides are, and that is risky. It is critically important to look in detail at what this really means, and the area that has been the orphan in the discussion has been agriculture. Here the discussions are only in the context of "how can you make money from agriculture" or "how can you get carbon credits from growing plantations of trees". The question "how can you feed the hungry" is just not part of the discussion. But it has to be, because this is where the risk is if we are not able to adapt to climate change.

Question. Göran Eklöf. Emilie, you mentioned the flexibilities and transition periods in TRIPS. But aren't these flexibilities narrowing as some of these transition periods are being phased out? Secondly, if you look at the problem of medicines, where monopolies are a more general problem, some years ago even further flexibilities were introduced as those that existed were found to be insufficient. But what we have seen is that these new flexibilities are also not practically possible for developing countries to use. Would you like to comment on the reasons for this – is it about procedural problems, or something else?

In your presentation you also spoke much about the existence of many competing technologies in alternative energy. The problem is that if you are going to invest in power generation you want the most competitive technology, the one that is most efficient and cheapest. Isn't there a risk that investments go into second-best technologies because of IPR protection?

Question. Anita Brodén, Liberal Party MP. We need biodiversity to meet climate change. Is it possible, and how, to maintain rich biodiversity within an IPR system? And how is it possible to increase agriculture and food production by 70 percent, as will be needed to feed the world population in 2050? The number of hungry people has now increased to over one billion.

"The general *defence of IPRs and of the technology regimes that exist is a threat to food security and to all our future in responding to climate change."*

Pat Mooney

Question. Leif Eriksson. The crucial question is how to balance the rights of the property holder and the public. When the idea of patent rights developed at the time of the French Revolution, the philosopher Condorcet who wrote the French law argued that inventions come out of a pool of public knowledge, and the property should return the knowledge to the public quite soon. The balance was in favour of the public, and not of the private property holder. In your presentation, Emilie, the first reason for IPR was to correct a market failure. Has there been a shift from the interest of the public to the interest of the property holder and the private companies? In discussing these issues we have to go back to the basic principles to understand how to interpret these questions.

Answer. Emili Anér. These questions are all interesting, and in most cases there are no "right" answers. And I agree that the discussion should be as specific as possible, but that is difficult in this kind of seminar. To start with the last question: yes, as in any other area the discussion about intellectual property policy has developed over the years. Since negotiations started about the TRIPS agreement in the mid-1980's there has been a much greater international harmonisation of standards. Before there were a number of different conventions to which countries could sign up as they liked. TRIPS and the dispute settlement system of the WTO have also raised the level of protection standards.

I would maintain that IPR is conducive to innovation, but not to every kind of innovation. And there are many other policy areas that influence these things. If you look at biodiversity protection, you can tailor your IP system to support the efforts that you are making by choosing appropriate forms o plant variety protection, and you can also support the Convention on Biodiversity – these two can be mutually supportive.

On the flexibility in the TRIPS agreement, this agreement sets the floor. What happens is that when bilateral agreements are negotiated, higher standards can be introduced. EU agreements with third countries usually do not add to what TRIPS says about patents, but some of the US agreements have more in their sections on patents such as limiting the grounds for which compulsory licenses can be issued. What EU agreements do add are stronger requirements regarding the enforcement of property rights. Bilateral agreements can be one reason why the flexibilities in TRIPS are not used more. It is also very difficult to implement an intellectual property system, and there has been a lot of technical assistance to developing countries. But in order to really reflect your own interests and needs, the understanding has to come from within. There is still a capacity problem that makes it difficult to see which options are available. Regarding the transition periods for LDCs in TRIPS, they are set to expire in 2013. But this period can be prolonged on the basis of " reasonably motivated request", and it has already been prolonged once. The reasonable motive was that the LDCs were just as poor as they had been when TRIPS was adopted. I think it will be possible to prolong it again.

Answer. Fredrik von Malmborg. On the question about the risk of going for second-best technologies: if you look at the renewable energy area or technologies for mitigation, I can't think of any patent or other IPR that covers an entire production unit. If you take a wind mill there might be patents on the gear system, or on the bearings, which could increase efficiency. But usually I think an almost as good wind mill can be built without the latest technology. In the negotiations, what many developing countries are focusing on are the high technologies, and not on the technologies that they need for reducing their emissions. This has also been the case in the academic arenas. To shift the trend of increasing emissions, and reducing them after 2020, they can't wait for new technologies. They have to apply what exists in the markets, and there are lots of energy efficiency and renewable energy technologies that have to be implemented now. When it comes to research and

"In the negotiations, what many developing countries are focusing on are the high technologies, and not on the technologies that they need for reducing their emissions."

Fredrik von Malmborg.

development of new technologies, the negotiations may offer other ways of coming around the issue of IPRs, such as systems for incentivising joint research and development where the parties can settle from the beginning how to deal with potential IP issues in the future.

Answer. Pat Mooney. I do think it is possible to establish government systems and regulatory systems in which you can encourage innovation and protect the interest of inventors. Where the risk comes is when you permit exclusive monopoly protection for inventions for a 20 year period which, for new technologies, is forever. It prevents other inventors from moving into that field. It is also a real danger in the system that we have now when – and I will stick with the agriculture example – you will be facing conditions here in Sweden that you have never encountered before. In the next few decades you'll be dealing with pests and diseases that you have never seen before, and you may have to develop whole new crops that you haven't used. In that context you need to avoid system like UPOV, which require legal distinctiveness, uniformity and stability. There are agronomic and legal aspects to these things, but the legal ones take more time, cost more money and reduce flexibility in the field. You have to prevent those legal obstacles from obstructing you from getting to where you need to be agronomically. The challenge here is that the costs of the system reduce the pace of innovation. It actually took Monsanto 16 years to introduce Bt resistance into the maize plant, and that is way too long. A lot of that time was to meet not only the scientific requirements, but also the legal ones. It cost then 150 million dollars, and that is way too much!

We need to find ways in which we can promote biodiversity in the field. This means developing novel ways of public researchers being able to work with farming communities and organisations around the world to make sure that we take advantage of the diversity that is there. And novel ways of accessing material in the gene banks so that they can be brought out in the field for more effective work with experimentation.

Question. Ivan Hjertman. I work with IP issues since a long time and follow what is going on in this field in the Wirls Intellectual Property Organisation (WIPO), the Convention on Biodiversity (CBD) and, to some extent, also in climate change negotiations. I think it is unfortunate to see the black-and-white picture that you see in various papers and statements. It must be realised that patents is a tool for achieving something. The value of a patent system in a given country depends on the level of industrial development and education, etc. The number of graduates in China now increases on an annual basis at a scale equal to the total number of graduates in many countries in the EU. These things must be taken into account. And regarding access to biodiversity, there are negotiations going on in the CBD on an access and benefit sharing regime. With the adoption of the CBD biodiversity, which had been the common property of mankind, became the property of the counties where you find these resources. There are very hard discussions on how this works out in the agrobusiness sector. My question to Pat is: if you want to scrap the patent system, what do you want to have instead?

Question. Maria Schultz, SwedBio. Formerly I worked at the Swedish Ministry of Environment, where I negotiated the access and benefit sharing (ABS) issues in the CBD. In relation to the suggestion on implementing the CBD: the CBD negotiations are very closely linked to WIPO and the WTO, but WIPO and the WTO are much stronger and have more 'teeth' than the CBD. It has been hard for developing countries to make their case in the CBD, and it has taken a very long time to negotiate an ABS regime. The implications for biodiversity and for farmers that Pat is talking about present real problems in relation to poverty issues and for adaptation to climate change, so this is something that I hope the other panellists will bring back to their work.

"We should not sit back and say 'we have an IPR system, so innovation is taken care of'. It doesn't work like that, because IPRs is only one factor among many."
Emilie Anér

Question. Tom, student. I would like to hear some reflections on the local context of the issues that have been brought up today. I see a big difference in how this must have looked before the fossil fuel era.

Answer. Pat Mooney. I have been speaking quite precisely about specific areas and even about specific patents, so I am not trying to be black-and-white and I have not been generic. What else can be done? I have said already that exclusive monopoly protection as part of the IPR system should be removed. That doesn't mean you can't have some sort of protection, only that it cannot be exclusive. You have to provide broader support and give equal access to technology. That would dramatically change the way innovation is made. I suggest specifically changing requirements such as uniformity in the UPOV convention, in order to have greater flexiblity. Here are other specific changes that can be made, but we cannot go into them all at this moment.

I don't agree with the interpretation of the CBD. The convention did not entrench the right of any country to have the right to their own biodiversity. Countries have always had that right, and have always been able to keep other out. What the CBD did was to entrench IPRs by saying that that should be allowed in all cases. It also said that anyone who collected anything prior to 1992 owned it.

Answer. Fredrik von Malmborg. On the local contexts: as I have said, in the climate change negotiations we are discussing IPRs on a very generic level, which might not help very much. The EU is proposing to go into more specifics when it comes to matching support for action on mitigation and adaptation in developing countries. The EU is proposing a process for that matching. This would be on a country-by-country basis, which is somewhat more localised.

Answer. Emilie Anér. The WTO is certainly a strong organisation, with a dispute settlement system and so on. The issue is not to make WTO weaker, but to make other organisations like the CBD and other multilateral environmental agreements stronger. Regarding biodiversity and agriculture, I understand that there has been quite a decline in public research in crops and animal breeds since the 1980's. We should not sit back and say "we have an IPR system, so innovation is taken care of". It doesn't work like that, because IPRs is only one factor among many. Companies will do what they are good at, they innovate things that they can sell and where there is a large market. There is a lot of research going on in rice and wheat and so on, but not much in the smaller crops that perhaps peasants in Africa will use. Even with IPRs, the market will not focus on these unless there are extra incentives. So there is a role for public research or for other mechanisms. But in my view that doesn't mean that we should scrap or overhaul the entire IPR system. We need to have complementary systems.

Concluding Remarks

Krister Holm. Looking back at the questions we had before this seminar it looks like we still have two sides here. It also seems that in some cases the IPR system could slow down the process of transferring technology to developing countries. We have also heard that patents sometimes can be an incentive for innovation, but sometimes they can be a hindrance. And looking at who controls most patents today, it would seem like it is the North that is gaining most from the present IPR system. I think this discussion can contribute to a broader discussion that we have in the Swedish Society for Nature Conservation about economic models that can help us get out of the many crises that we are in now. We have raised it in many conferences, and there are many members in our organisation who want to discuss this. Patents are part of the present market economy, and understanding their role better could contribute to addressing the climate crisis, the food crisis, and the inequalities in the world.

Participants

Emilie Anér

is an analyst at the Swedish National Board of Trade (Kommerskollegium). The Board is a governmental agency that supplies the Ministry of Foreign Affairs with analysis regarding foreign trade and trade policy. Her areas of expertise are intellectual property rights and trade in services in the contexts of WTO, other international organizations, as well as EU's bilateral trade agreements. She has written several reports on the relationship between intellectual property right regimes and development.

Fredrik von Malmborg

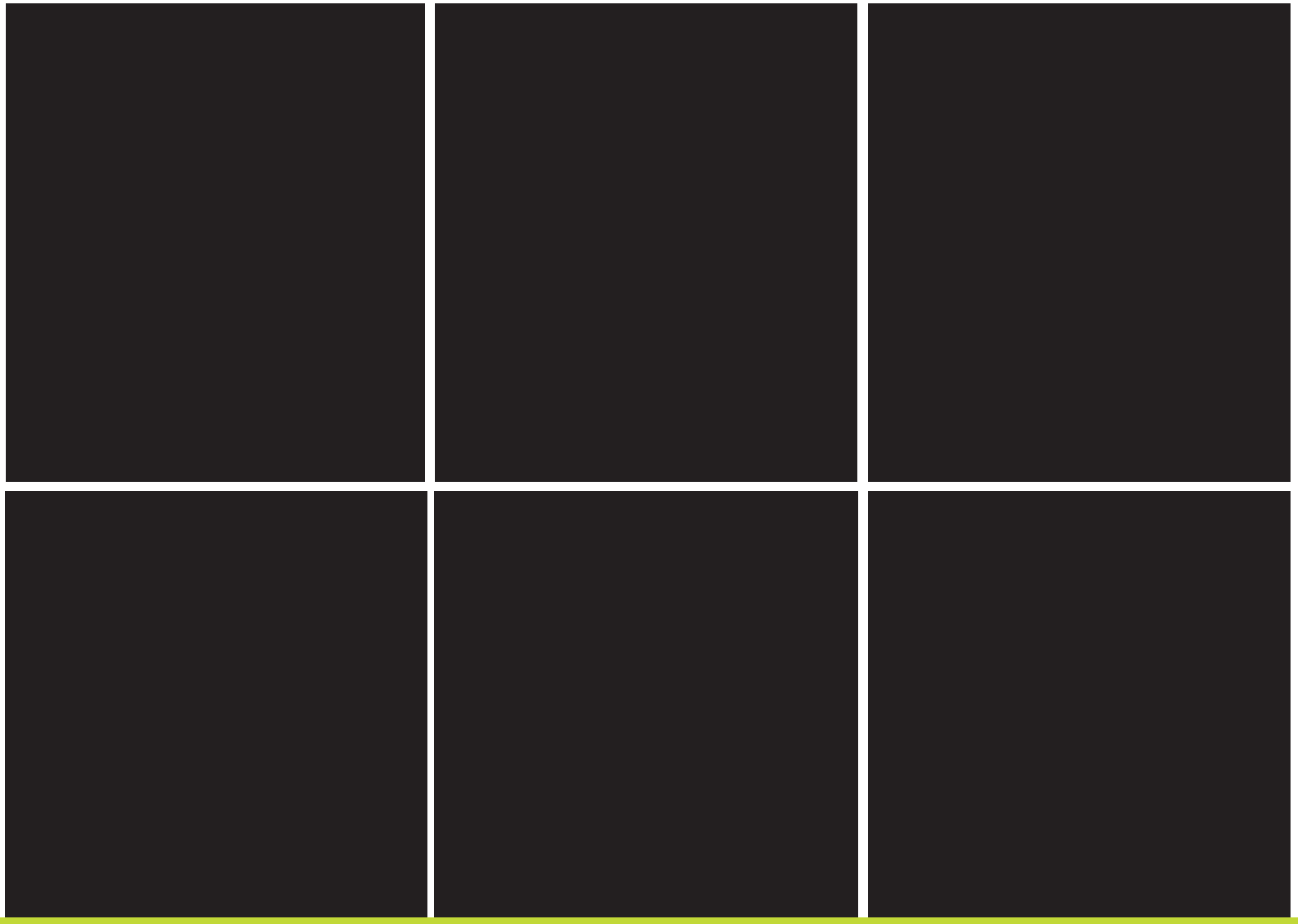
is head of section in the Energy Division of the Swedish Ministry for Enterprise, Energy and Communications. His responsibilities include coordination of energy efficiency policies, and the intersections of climate, energy and innovation. In the climate change negotiations, he has been working with technology transfer issues for several years, including leading the EU experts. He is currently co-ordinator and issue leader on issues related to IPR and climate technology transfer. Dr Malmborg holds a PhD in Industrial Ecology and is associate professor (docent) in Environmental Systems Analysis and Management at Linköping University, where he conducted research on corporate environmental strategy and innovation.

Pat Mooney

is the founder and director of ETC Group (formerly RAFI), a civil society organisation involved in research, analysis and advocacy on issues relating to technology, environment and development. Mooney and the ETC group has pioneered work highlighting environmental, health, social and cultural concerns in relation to a number of new technologies. It was one of the first to point to the implications of the convergence of the seeds and pesticides industries, followed the emergence of biotech at its early stages and exposed the first patent on human cell lines, and has in recent years followed the developement of converging technologies at the nano-scale intensively. Mooney has tracked the mergers of life industries and corporate control of intellectual property rights for many years.

Krister Holm (moderator)

When the seminar took place Krister was based at the SSNC international department with a special focus on trade and environment. He led the work to examine the impact of EU trade policy "Global Europe" on environment and sustainable development in developing countries, and focused on the connection between trade issues and climate change. Prior to joining SSNC he worked with trade related development cooperation at Sida. Currently he is the Program Manager of BetterAid, a global civil society platform that engage in development cooperation to deepen aid and development effectiveness.



Seminar report from Seminar no. 9:
Visions and solutions:
Ambitious emissions reductions and a Green Energy Revolution

The final seminar of the 'Key Issues' series 2009, taking place at the COP15 itself, featured a few of the highlights from previous seminars. How can constructive and win-win approaches be used to tackle the simultaneous crises of poverty, energy poverty, and climate change? What are possibilities for a front-loaded global investment program with feed-in tariffs to lower the cost of renewable energy? Could the EU reduce emissions domestically by forty percent by 2020? And how can such visionary approaches be brought into the mainstream of the UN negotiations, as well as into the broader public debate on climate change?

Sound recordings and this seminar report can be downloaded at www.naturskyddsforeningen.se/keyissues9

Participants: Alan AtKisson, President, AtKisson Group, Svante Axelsson, Executive Director, SSNC, Tariq Banuri, Director, United Nations Division for Sustainable Development,Thomas B Johansson, Professor, International Institute for Industrial Environmental Economics, Emma Lindberg, SSNC, Nebojša Nakicenovic, Deputy Director, International Institute for Applied Systems Analysis, Sunita Narain, Director, Centre for Science and Environment, Johan Rockström, Executive Director, Stockholm Environment Institute, John Schellnhuber, Director, Potsdam Institute for Climate Impact Research

Moderator and project coordinator: Niclas Hällström, SSNC The seminar took place: 16 December 2009, COP15, Bella Center, Copenhagen
Layout: Espmark & Espmark Printing: Stockholm 2010 www.naturskyddsforeningen.se/keyissues

Produced with financial support from Sida. Sida did not participate in the production of this publication and holds no position on the opinions contained therein.

Visions and solutions: Ambitious emissions reductions and a Green Energy Revolution

Svante Axelsson
Welcome and Introduction

I would like to welcome all of you to this side event at the COP15 where, dare I say it, in contrast to the wider negotiation game we will be focusing on possibilities and concrete solutions to the climate crisis. It is very frustrating to hear industrialised countries debate emissions reductions and climate policy as if it were all a matter of burdens, effort, and hard work; and that is why this kind of visionary discussion is extremely important.

If one looks at the targets that are on the table, they amount to a collective reduction by 13-18 percent; and yet research has shown that everything less than twenty-five percent is actually beneficial for the economy. Thus, the negotiations so far really only cover the low-hanging fruits that are to be considered benefits rather than burdens.

We know that we have to act immediately; we know that we will all lose out if we fail to do so. The key thing now is to move beyond the whole burdens debate, and start discussing opportunities. That is the way to raise the level of ambition and to strengthen the targets.

Niclas Hällström
Introduction

We have been arranging a whole series of 'Key Issues' seminars over the course of this past year, tackling practically all of the trickiest climate issues. Today we will especially highlight two of those, both of which have been covered at length on previous occasions.

The first part will address the issue of rapid emissions reductions in industrialised countries by presenting a brief summary of a report by the Stockholm Environment Institute (SEI). This newly released publication shows how it would in fact be possible to reduce EU domestic emissions by forty percent by 2020. We at SSNC have argued for this for some time, policy-wise; but until now, there has been little hard research on the issue.

The second part concerns the other half of the climate challenge: reconciling strong climate policy with the imperative of development and poverty alleviation in developing countries. We are very happy to be able today to present the ideas which Tariq Banuri of the UN Commission on Sustainable Development introduced early on to us at SSNC: proposals for a Green New Deal, a global Marshall Plan, a Green Energy Revolution; the concept has many names.

In October, right after the UN Bangkok meeting, one of our Key Issues seminars focused specifically on the idea of a program for simultaneously tackling energy poverty and climate change through, among other things, a global feed-in tariff system. Today, we will be having another look at these concepts. The ideas themselves will be presented by Alan AtKisson; however, Tariq Banuri will also be able to answer any specific questions during the panel interaction towards the end.

As you will notice, then, the emphasis for today's seminar is very much on visionary, yet real and doable solutions to the climate crisis. Before going into what they are, though, we have asked Professor John Schellnhuber of the Potsdam Institute to brief us all on the findings of the most recent climate science.

John Schellnhuber
The scientific backdrop

And so, it seems the unpleasant task of reminding you what is at stake falls on me. Climate scientists are always the scapegoats, as they are the ones explaining what the problem is; it is much more agreeable, I would imagine, to rather provide the solutions. Still, having chosen this profession, I suppose I should consider it my own fault.

In any case, I will now present the scientific backdrop. This morning, I had similar briefing with the German delegation; and as I stressed to them, it is absolutely vital to keep the sheer scale of the challenge in mind.

First, let us say that the two degree target is a reasonable one. Just assume that for the moment; in a little while, I will

"We will find that at its current rate of consumption the US will have spent its share within five years from now; they would effectively be carbon bankrupt by 2015."

John Schellnhuber

provide some rationale for doing so. Of course, in a perfect world we might wish for no amount global warming at all; the best possible outcome would be a complete restitution of the atmosphere returning us to the pre-industrial state when atmospheric concentrations of CO_2 were 280 parts per million. I do think that is the correct final target. Still, it is not one that can be reached overnight; indeed, it is likely that we will need a century at least.

In any case, let us assume we need to keep below two degrees. Now, the latest climate science tells us that there is a very simple relationship between cumulative CO2 emissions – say, emissions until the end of this century – and the resulting global warming. The relationship is almost linear. As a result, if somehow we knew the total amount of emissions until the year 2050, calculating the resulting global warming would be a straightforward exercise.

I should emphasise, then, that the pledges put on the table so far in the negotiations put us on a trajectory where the Earth warms by at least 3.5 degrees. That figure is, if you will, the current state of the global thermostat; we must seek to lower it here in Copenhagen.

Also, if we want to achieve a two-thirds probability of staying below our assumed target of two degrees, the implication is that we will have a carbon budget of around 750 Gigatonnes of CO_2 emissions to spend until the middle of the century. If for example we divide that budget equally on a per capita basis, we will find that at its current rate of consumption the US will have spent its share within five years from now; they would effectively be carbon bankrupt by 2015.

However, the most important issue that I would like to draw your attention to is that of timing: at what point do we bend the emissions curve downwards? As you will see, timing is the reason why the SEI report is so very important.

Let us picture three different emissions trajectories that all eventually add up to 750 Gt by 2050; that is, they are all consistent with our carbon budget. The first case, the first emissions path, implies that we peak global emissions in 2011 – just one year from now. Then, in order not to exceed the carbon budget, emissions would thereafter need to drop by around three percent per year. If on the other hand we wait another four years, peaking by 2015, then already the required rate of reductions beyond that point will have risen to more than five percent per year. That is one Kyoto Protocol per year, in effect; not a piece of cake.

And finally, what happens in the third and much more realistic case where emissions do not peak until 2020? In fact, I have noted that some people even discuss peaking emissions beyond that point; for example, at a Chinese side event which I attended yesterday someone said that China would not peak until 2050. Anyway, peaking in 2020 while staying within the carbon budget then implies emissions reductions of nine percent, every year. Doing so is, by any current standard, unimaginable.

Therefore time is absolutely of the essence, because if we overshoot early on we will have to make up for it later; and again, this can get extremely difficult. How to achieve a peak before 2020 is the most crucial issue that should be negotiated at this conference; yet of course, no one talks about it.

Moving on to my second main point, this very week I contributed to a special feature in the Proceeding of the National Academy of Sciences (PNAS), which is one of the leading scientific journals in the world. That feature was a collection of ten articles all concerning potential global tipping points: the fatal systemic risks lurking somewhere beyond the two degrees line. One of these crucial planetary tipping points is the meltdown of the Greenland ice sheet, which would raise sea levels globally by seven metres.

If anyone has doubts regarding the absolute necessity of staying below two degrees, I can only recommend that they consult this latest issue of PNAS. In it, they will find the latest findings of peer-reviewed science on this topic.

Thirdly, to underpin the messages of peaking global emissions by 2015 and keeping to a carbon budget consistent with two degrees of warming, this May there was a global sustainability meeting of Nobel laureates, hosted by Prince

"The EU reducing emissions by forty percent by 2020 is in all likelihood insufficient. According to our calculations, it should rather be sixty percent"

John Schellnhuber

Charles at his palace in London. That meeting produced a memorandum with signatures by more than sixty Nobel laureates including Mikhail Gorbachev, the Dalai Lama, Muhammad Yunus, twenty physics laureates, and so on. Steven Chu, the US Secretary of State for Energy, also took part in the discussions.

This statement, coming from the highest possible level of the scientific community, supports everything I have just said. It also backs the idea that dividing up the carbon budget must be done in accordance with principles of fairness and equity; and the only fair principle that I know of is equal per capita distribution. Incidentally, adhering to such principles means that the EU reducing emissions by forty percent by 2020 is in all likelihood insufficient. According to our calculations, it should rather be sixty percent. On the other hand, we know this will not happen; and forty percent is still a step in the right direction. Certainly, it would be a shame if the EU could not even deliver thirty percent, unconditionally, at this conference.

In any case, that is the scientific backdrop. Things are certainly looking difficult right now; still, given the powerful people due to arrive here tomorrow, I suppose we will see.

Johan Rockström
How can EU achieve -40% domestically by 2020?

We have asked the question of whether the EU can do more; specifically, whether it would be possible for its 27 member countries to collectively and domestically reduce emissions by forty percent by 2020, and by one hundred percent by 2050. The starting point for our work is very much the same concerns that were just raised by John Schellnhuber. They are also part of the so-called 'Copenhagen Diagnosis': an update on the latest climate science released yesterday. Tonight at 7.30, we will follow up with the 'Copenhagen Prognosis' building on the Diagnosis with a particular focus on solutions. Again, in the EU case the implication is that domestic emissions reductions by at least forty percent by 2020 are necessary.

As John has already done a good job of covering the risks, I will not cover them in any detail. I will simply mention a recent study where he and I, together with some thirty environmental change scientists, put the findings of climate science into the broader context of potential tipping elements in the Earth system. When one factors in the risks associated with the biosphere, the stratosphere and other such 'sink' components, it becomes clear that a European target of forty percent reductions by 2020 is really the bare minimum.

In addition, there is also the development challenge. Even if all developed countries were to achieve forty percent reductions until 2020, staying on a two degree pathway implies that developing countries would still be left with an enormous challenge to reduce their own emissions. There is no way that we could stay within those limits if the majority of developing countries of the world do not make very radical emissions cuts of their own. And as you know, therein lies the drama; these countries have a right to development and are currently, if anything, energy starved.

What, then, does the EU need to take on if emissions reductions are divided fairly and equitably, as John argued? We have followed a somewhat different path than the pure per capita approach, using as our starting point each country's responsibility for the problem since the year 1990, as well as its capacity to deal with it. In this manner, we have arrived at the conclusion that further cuts for the EU, of up to eighty percent, will in fact be needed.

This is in line with John's argument; in fact, he has shown in another study that Annex I countries essentially have to reduce emissions to zero at some point between 2020 and 2030. Now, all of this cannot of course be done domestically. Thus, we have looked at how far the EU might push ahead in terms of domestic emissions, while assuming that the remainder could be a matter of financing mitigation action in developing countries. In any case, our analysis shows beyond any doubt that offsets in the South cannot be incorporated into domestic targets without us breaking off from the crucial two-degree trajectory.

"… offsets in the South cannot be incorporated into domestic targets without us breaking off from the crucial two-degree trajectory."
Johan Rockström

Our approach has been quite standard, entailing a sectoral analysis examining in turn the transport, industry, household, service, and also the agricultural sectors of the economy. It has been a step-by-step, country-by-country affair. We have incorporated all available data concerning greenhouse gas emissions as well as sectoral opportunities regarding new technologies and national regulatory policy.

All this has then been fed into our energy model, LEAP, which is being used in 150 countries across the world and might be said to be the mainstream model under the Kyoto Protocol for constructing energy scenarios. The period under study extended until 2050, though I will be emphasising our findings for the year 2020.

Note that a number of 'boundary conditions' were applied. We were supported in our work by Friends of the Earth, who introduced a number of normative restrictions which we have followed in our subsequent analysis. This means that we have examined what is feasible even under a very constrained policy scenario. Nuclear power was not allowed to expand beyond today's installed capacity, and carbon capture and storage was also not permitted. Likewise, we assumed there would be no large increase in biofuel production. Finally, we focused on domestic emission cuts only: no offsetting of emissions was allowed.

One weakness may be admitted: our study included emissions only from the production of energy, electricity, and the like, excluding consumption. Why is this important? Well, for instance, Swedish emissions would likely be ten to fifteen percent greater if our net import of consumer products were also considered. Thus, in this sense our analysis might be said to be conservative, because the emissions cuts needed will be correspondingly smaller.

One final normative assumption is that it will not be possible to escape this crisis purely through economic acceleration. We need to accept some lifestyle changes; also, based on existing science, we assume that due to action on climate change the overall EU economy will grow by a total of sixty percent until 2050 rather than the eighty percent of business-as-usual. Still, although there is some minor slowing of GDP growth in our analysis, this is very much a growth-oriented framework.

What are then the model results? Based on current estimates, we assess that up until 2020, passenger transport demand will only see the slightest hint of levelling out. On the other hand, we are also counting on thirty percent increases in fuel efficiencies by 2020. Also, we assume that twenty-one percent of all cars are hybrids at that point. Two percent, we assume, will be fully electric.

Thus, it is a dilemma that transport demand will not really level out until 2030 at the earliest; still, we do believe that demand for transport energy may stabilise long before then because there are good opportunities for very rapidly reducing the use of fossil-based fuels in the transport sector. Already before 2020, oil demand in the transport sector could begin to decline very rapidly while electricity gradually increases.

Moving on to industry, the transformation will have to be more rapid. Going fossil-free will require major investments in new infrastructure and production systems in heavy industry. However, as Svante argued, we believe there are many cheap or even profitable investments that could easily be made in this sector. By 2020, we could already be moving very significantly away from oil consumption in industry indeed, this is one of our more promising results.

For households, the trajectory is similarly ambitious, in effect bending the curve starting immediately. We assume that essentially the entire EU moves towards a building standard which is equivalent to today's passive houses. That is, by 2050 the net energy use of households should be practically zero. This is done through an ambitious yet feasible policy of retrofitting existing inefficient offices and housing. In addition, the use of fossil fuels in the household heating sector is slashed by half over the course of the coming decade.

Household electricity use is constant throughout the

period. This is because the general trend runs towards increased demand for electricity; and this is only partly offset by the major efforts made towards increasing the energy efficiency of households. In any case, our main conclusions are that use of natural gas in households and in the service sector decreases; and there is near-complete phase-out of oil dependence in households.

Incidentally, the Swedish experience, where fossil fuels were successfully and all but completely phased out in district heating, is evidence that this is possible. It is worth noting that this was a result of twenty years of policy reform; not the least through what could be considered a draconian carbon tax of 100 Euro per tonne of carbon dioxide. Thus, for twenty years Sweden has had a carbon tax which is roughly twice the size of what science today considers necessary for creating incentives and decoupling economic growth and emissions.

Next, we also included emissions from the non-energy sectors of the economy, such as land use and waste management. With land use one may note that EU soils act as a net carbon sink, and a substantial one at that. However, our assessment is that the capacity for carbon sequestration in soils is nearing saturation, meaning we can not count on this sink to function with constant effectiveness until 2050. Already there are scientific findings indicating that this free ecosystem service is being weakened.

Finally, electricity production. Obviously, in order to achieve sufficiently ambitious reductions coal needs to be phased out very rapidly. As I mentioned, we do not allow further expansion of nuclear power, implying that nuclear goes into a slow decline. In fact, the only possibility consistent with the two degree target is import of electricity from North Africa and other places. Indeed, we are already seeing projects for large-scale electricity production in the Sahara desert. Finally, wind power sees growth that is absolutely tremendous – though still within reason – from 2020 onwards.

Now, can we draw any conclusions concerning emissions? First, we noted that unless there is a good deal in Copenhagen, and unless the EU assumes further strong leadership on climate change, EU emissions of greenhouse gasses will remain more or less stable until 2050 due to economic growth.

In contrast, translating our scenario into climate terms, already by 2020 emissions from all sectors are falling. Key requirements for this to happen is a gradual reduction in electricity production as well as household and transport energy use – bearing in mind, as I said, that transport demand will keep on rising for the next few decades.

The key implications of all this for the climate negotiations here in Copenhagen is that the EU could indeed reduce emissions by forty percent over the course of the coming ten years, dropping from its current 3800 million CO_2 equivalent metric tonnes to somewhere around 2300 million tonnes. This would be nothing short of a profound transformation.

What of per capita emissions? First, note that currently there is tremendous diversity even within the EU itself in terms of per capita CO_2 equivalent emissions, with a range between four and ten tonnes per capita per year. Under our scenario, by 2050 there would be a convergence at less than two tonnes. By 2020 EU per capita emissions would be roughly five or six tonnes, which is just above the level of the current global average: thus, even with forty percent reductions our per capita emissions in ten years will still exceed the current global average. This implies that there would be no convergence in equity terms by 2020.

The direct costs associated with our scenario have been difficult to assess, although we have performed some rough calculations indicating a cost of 1.7 percent of GDP in present value terms. This is without any doubt a very small sum compared to the scale of the risks we face.

Finally, let me just stress that there are good reasons for doing this. Not least among them are, as we heard, equity concerns. As illustrated by the latest report by Kofi Annan's Global Humanitarian Forum, because of historical

"How can climate policy and investment in renewables be redefined as a potential win-win situation rather than a zero-sum game?"
Alan AtKisson

emissions Europe is to a disproportionately large degree responsible for climate change. And yet there is a growing body of scientific evidence indicating that Europe can also make a very profound contribution to global efforts to keep warming below two degrees.

Alan AtKisson
Global feed-in tariffs and a Green Energy Revolution

I will now try to give you all a sense of one possible strategy for addressing climate change. There are of course many dimensions to the problem, ranging all the way from adaptation to forest conservation. I will deal only with the energy dimension; still, as I am sure you would all agree, this is a crucial one.

Now, the work that I am presenting today at the request of Tariq Banuri of the UN Division for Sustainable Development is based on a very comprehensive report, the *World Economic and Social Survey (*WESS), which is put out regularly. Its most recent version focused strongly on the energy-development-climate nexus and on pathways to a renewable energy future that meet several needs at once, including ending energy poverty.

Having not participated in carrying out the analysis itself, I can afford to compliment it: the WESS report contains one of the most comprehensive modelling approaches I have ever seen, taking a very hard look at what impacts an energy transition would have on economies and per capita incomes worldwide, in addition to actual effects on emissions.

However, the key insight is that a shift is needed in how we think about mitigation of climate change. That is, how can climate policy and investment in renewables be redefined as a potential win-win situation rather than a zero-sum game?

Now, at the UN Department of Economic and Social Affairs (DESA) our job was to take the very thick WESS report and condense it into a strategic policy roadmap for scaling up renewables investment globally, quickly, and more importantly, sustainably. We have taken the currently available analysis and figures, compared those with the needs as dictated by science, and tried to provide a way forward in concrete policy and investment terms.

We asked: how can self-sustaining virtuous cycles of investment, reinvestment and expansion be created that quickly bring down the price of renewable energy to the three to five cents per kWh which entails global affordability? I will soon take a closer look at why that question is essential to ask.

But first, some background information. As many of you are probably aware, some 1.6 billion people still have no access to electricity; 2.4 billion cook using firewood or dung and are thus exposed to dangerous levels of indoor air pollution. Yet ninety percent of the future energy infrastructure in such countries is going to be built in the period between now and 2050. As a result, the opportunity to steer the energy markets of developing countries into renewables is huge; and it will either be one that we miss, or one that we grab.

To succeed, we need to take a hard look at how to push down the price of clean energy. Of course, prices are already falling and dramatic technological advances are being made in places like China, where solar energy companies have now three times revised their estimates of when they will achieve price level targets. Yet despite this, even under the most optimistic projections prices are not going to fall fast enough to be consistent with staying below two degrees.

Thus, left to itself, we know for sure that the market will not provide this. One example is given by a recent comprehensive study from the UK Committee on Climate Change which examined market mechanisms designed to support renewable energy and reduce emissions. Now, these mechanisms had been left to their own devices, if you will; and it turns out that they had achieved only thirty to thirty-five percent of what was needed during the period under study. Policy is necessary; and that means subsidies as well as steering the development of the energy infrastructure.

The key to lowering the price of renewable energy is scaling

"A figure somewhere between 100 and 150 billion USD per year, over a period of roughly fifteen years, would be enough to achieve in time the goal of pushing down the price of renewables to affordability."

Alan AtKisson

up its production. With expanded production, economies of scale and learning-by-doing are unleashed. This is the leverage point that we will need to push hard on, globally. It will not take us all the way, but this is one key puzzle piece that we need to consider.

When it comes to getting this job done, feed-in tariffs are pretty much the only credible policy mechanism out there – in my mind, at least. In case you are not familiar with them, they are a guaranteed price for renewable electricity development. Producers building for example a solar plant or a windmill are paid a price for delivering electricity to the grid, and this price is preset, guaranteed, by the government.

More than fifty countries have already implemented feed-in tariff schemes, and even more are about to. South Africa and India use them; China has only recently expanded its feed-in tariff policies; and, in another side event on technology transfer I heard from UNEP Executive Director Achim Steiner that within six months of establishing a feed-in tariff system, Kenya had secured financing for a 350 MW wind plant which would increase total national electricity production by roughly twenty-five percent.

There is exceptionally good data on this, some of which comes from my fellow guest speaker, Thomas B Johansson. The figures show that feed-in tariffs are head and shoulders above all other policies when it comes to results: they are something like seven to eight times more effective in terms of installed capacity.

The strategy embedded in the WESS report, which we have been laying out more clearly in policy terms, basically involves front-loading and rapid scale-up of investment in renewable technologies. This happens through an international investment fund, with national governments overseeing and managing inputs to their economies.

It would not be a global program in the sense that it would have a unified structure; however, it would have to be globally coordinated in some fashion to make sure that funds are channelled to the right places at the right time. In any case, as we have seen most recently in Kenya but also in countries like Germany and Spain, once the feed-in guarantee is in place, public and private financing will follow suit.

The beauty of the feed-in tariff approach is that the subsidies are gradually phased out over time. In our report we have not specified what level of investment will actually happen, because that is a political decision hinging on what happens here in Copenhagen and in the months and years to follow. Nevertheless, by our calculations a figure somewhere between 100 and 150 billion USD per year, over a period of roughly fifteen years, would be enough to achieve in time the goal of pushing down the price of renewables to affordability.

Yet it is absolutely critical that we do not fall into the trap of putting the investment plan on hold until those amounts have been secured. This should happen at whatever scale is currently politically acceptable, regardless of whether it is physically sufficient to achieve climate stabilisation.

Finally, let us then run through the eight key features of our proposal. One: set clear targets for the cost of renewable energy. In order words, it should be clear that the explicit point of the program is to push energy costs down to a certain level; ideally, somewhere between three to five cents per kWh. That is global affordability; that ensures that wind or solar is no longer a luxury good in rich countries, but one which people in places like Pakistan or Kenya can afford as well.

Two: the level of the feed-in tariffs need to be based on the best estimates of what will happen to the price. Already costs are declining very rapidly. Thus, it may be that our projections are overly conservative. It is possible to imagine a scenario where, once investments get underway, costs are brought down even faster than expected, so that the subsidies can be phased out ahead of time. In any case, the bottom line is that the feed-in tariffs are not some open-ended process of financial transfers, but a time-limited investment in achieving a specific result, namely that of making renewables affordable.

Three: for each country, figure out what they can and should be contributing to the feed-in subsidy. Also, insure that all countries have the help that they need for bridging the gap between what they can afford and what they need to achieve in terms of improving energy access and/or reducing emissions.

Four: establish a global investment fund for renewable energy. Again, this is a time-limited initiative which will only exist for the fifteen or twenty years necessary to get the job done, depending on how quickly investment is scaled up.

Five: provide the additional support that least-developed countries need with grid expansion, capacity building, research, information sharing, and so on; insuring that they can keep up in the race to roll out renewable energy.

Six: create mechanisms to serve off-grid communities, to insure that energy can be accessed by everyone rather than just those connected to the grid.

Seven: in support of the investment program, initiate a rollout of innovation centres and a kind of global 'Conservation Corps'. As you may know, the agricultural Green Revolution involved a rapid and rather comprehensive range of policy support, financing, and research institutions that all supported farmers and policy makers in making reforms. I recognise that not all support the actual content of the Green Revolution, but the mechanisms certainly worked; and we need something similar today. The 'Conservation Corps' would provide opportunities for idealistic young professionals, for skilled retirees, and for working people in relevant countries to contribute as renewables are rolled out.

Finally, eight: develop an institutional architecture. This being an object of political negotiations, our proposal was primarily concerned with fairly new institutions, although in relation to existing ones. In any case, we did identify a need for some kind of accountability mechanism. Given that we will in essence be buying renewable energy futures for the world, we have to be able to see clearly the returns on that investment.

In short, that is the roadmap. Again, by our calculations we are looking at a total of 1-1.5 trillion USD over the course of ten to twenty years, depending on how fast investments are ramped up. Now, that buys energy affordability. That buys the end of energy poverty: an energy market where renewable energy is the default option for energy build-out. That buys a market supporting the additional and complementary research and development which we need on things like storage technologies to solve the intermittency problem.

Speaking of which, just last night I heard of a new technology in California using melted salt for energy storage in solar concentration PV plants; the salt stores the heat overnight, then drives a turbine together with a little bit of natural gas to yield baseload solar electricity.

Technologies like this are coming, and with a massive expansion program they will get here even faster. This is the magic of scale economies. In order to take off, however, it needs a major investment push from the world as a whole, with the understanding that we will be buying a renewable energy future. We will not just be buying time to avoid an undesirable future, but rather buying our way to the desirable one.

Summing up, we propose a major investment push that will require significant funds in the short term but which also offers tremendous returns. As renewables scale up, technologies improve, standardisation occurs, markets expand, revenues increase, and user costs fall. All these elements combine into one great virtuous cycle with immense spin-off benefits to the world as a whole. Regardless of what comes out of Copenhagen this week, we believe that this is a plan worth putting force behind, as well as energy into – if you will pardon the pun.

Clarifying question from the audience. A very simple question. Are you talking about electricity poverty, or energy poverty? There is a big leap from one to the other.

Answer. Alan AtKisson. The way that the issue is framed implies that our main focus has been on electricity; however, several complementary – and acute – issues such as the problem of cooking fuels have also been included. In fact, we pushed hard to make sure they were. Thus, it really is energy, not just electricity. The idea is that the financing mechanisms we propose could be targeted towards non-electricity issues as well.

Reflections from the panel

Tariq Banuri
Introducing the panel

Let me say what an honour it is to be sitting on this panel. Everyone of the participants is a superstar.

Sunita Narain, head of the Centre for Science and Environment; the paper she wrote back in 1990 together with Anil Agarwal, Global warming in an unequal world, was a real game-changer for how people thought about climate change.

Johan Rockström, head of the Stockholm Environment Institute and the Stockholm Resilience Centre; with his vital research on planetary boundaries, the concepts of green and blue water, and more.

John Schellnhuber, head of the Potsdam Institute, has been instrumental in helping us think about climate change for a long time.

Nebojsa Nakićenović of IIASA, one of the lead authors on several IPCC reports including the third and fourth Assessment Reports and the Special Report on Emissions Scenarios.

Thomas B Johansson, one of the giants in the energy field, now the chair of the Global Energy Assessment; who already in the 1987 report Energy for a Sustainable World enabled us to think with considerable clarity about energy poverty.

Svante Axelsson, director of the largest environmental NGO in Scandinavia, the Swedish Society for Nature Conversation.

And finally, my dear friend Alan AtKisson, president of the Balaton Group which gave us the Club of Rome reports; he has led the Earth Charter process in the past, now runs his own environmental consultancy firm – and helped us produce the UN document he just presented.

Nebojša Nakicenovic

I have to say that I agree with almost everything I have heard so far. John set the stage quite well by outlining just how deep we need to bend the emissions curve: we have only around a thousand Gigatonnes of CO_2 equivalent emissions over the next fifty years. Interestingly, that is on about the same order of magnitude as total cumulative emissions since the industrial revolution. Thus, in a sense we are only halfway through the fossil era – or at least, the emissions era, if you think that emissions can be somehow offset.

Being then already halfway down the path of dangerous climate change, we really have no time to lose. Johan provided an excellent account of the boundary conditions of that process, and we have heard about some possible solutions in the shape of green investment and feed-in tariffs. Yet trying to find the way forward, putting all these parts together, I find that in many ways we really have to rethink everything that we have been doing so far. We are talking about a grand transformation here, a completely new path and paradigm for development with much less emphasis on consumption and much more focus on efficient and clean technologies.

I would like to highlight two key components of such a new development path, features that in my mind have also been central to today's presentations. Number one, as we have heard from John and Johan, decarbonisation. The future economic system cannot include carbon technologies. At the very least, we must find ways of capturing carbon rather than emitting it to the atmosphere.

Number two, green development. I do believe the crucial issue in this context is access. At least one third, if not half of the global population have not really benefited from the first thousand Gigatonnes of emissions. We should view the next thousand as a cumulative investment in bringing development to the people who are currently still left out.

I would like to briefly mention a few numbers before concluding. First, let us put the challenge into perspective: can it be done? I think the answer is yes, provided of course that we have the will and the right institutions in place. Current energy investment is anywhere between five and six hundred billion a year. This year, because of the economic downturn, the true amount is likely near the lower end of that range. But the global economy as a whole is on the order

of fifty trillion, making energy investment a comparatively small amount.

Interestingly enough, between two and three hundred billion are put into energy subsidies. Thus, as I understand it, the global feed-in tariff is really about redirecting the massive subsidies going into conventional energy systems into building a green development path. And again, I think it can be done and that the formula for success is clearly provided in the DESA report.

So, let us keep in mind the three hundred billion figure for annual energy subsidies. I think no more than half of that amount would be enough to solve all issues of access. One hundred and fifty billion USD is a very small amount: one tenth of a cent, if you will, of every dollar of total energy value-added. Even back-of-the-envelope calculations show that this would be enough over the next twenty years to provide electricity connection to all of the five hundred million households that currently lack access. One could even provide essential fuel access as well.

As I said, let us keep this in mind. Now, how much would today's proposed investment program cost? Most probably, also around one hundred and fifty billion annually. In the WESS report, for instance, there is an estimate that the total cost of lowering the price of photovoltaic solar is roughly one trillion. Taken over the course of twenty years, the annual cost would then be no more than fifty billion. Of course, one will also need to support clean technologies other than solar PV. Yet, even if we assume that we need feed-in tariffs for four or five different technology systems – or perhaps six or seven, to hedge for the risk that some technologies might not succeed – annual cost will probably not exceed one hundred and fifty billion. Thus, I would argue strongly that it can be done.

Finally, I would like to highlight one point that perhaps was not clearly made in the presentation. As we heard, by investing in a feed-in tariff system, we will be improving new technologies and reducing costs. I would like to stress that, although an uncertain process, this is not something that has never been done before. In fact, it is a situation in which we have found ourselves many times before. When cars were introduced, they were more expensive than horses. When digital watches first arrived on the market, they also were much more expensive than their analog counterparts; and it was the same with jet engines and propeller aircraft.

There really are hundreds and hundreds of examples; all successful technologies have undergone this process of driving down costs while developing superior quality – which, in our case, would be decarbonisation and environmental sustainability. The feed-in tariff, I believe, is one of few instruments that can very strongly drive market access for new technologies as well as research and development. Aggressive investment in the short term can indeed be a profitable course of action in the long term.

Thomas B Johansson

I too agree with much of what I have heard here today, and I think these issues are extremely important. It also seems to me that one of the most promising aspects of the investment proposal is that it is a big-push strategy for meeting multiple objectives at once. It is not just about climate change mitigation.

What this means is that once you start taking action on renewables or energy efficiency, benefits can be expected in all of the multiple areas. The importance of such a structure for a successful outcome in the negotiations cannot be overstated: while the argument for adopting the program will not be the same everywhere, there is at least some benefit to be had for every single constituency. And of course, one benefit is shared by all: that of climate mitigation.

One of the beauties of feed-in tariffs is that they are relatively inexpensive, yet produce substantial results. The experience with feed-in tariffs in countries such as Germany and Spain was that these policies fostered very impressive growth. In Germany, the 2010 target for renewable electricity was exceeded already two years ahead of schedule: generation from renewables is now way beyond the original forecasts.

"The global feed-in tariff is really about redirecting the massive subsidies going into conventional energy systems into building a green development path."

Nebojša Nakićenović

With the other main approach to supporting clean energy – certificate systems – that could never happen. Certificates encourage no growth whatsoever in renewables beyond the target that is set. Given that the situation we are in calls for very large investment over a very short time, I think it is only prudent to go for policy mechanisms that potentially could deliver beyond targets. After all, there is no such thing as going too quickly in this energy transformation.

It is also worth pointing out that feed-in tariffs have performed admirably not only in industrialised countries, but in China as well. As you know, China has doubled wind energy investments every year for the last five years. This has been achieved largely thanks to a feed-in mechanism.

Finally, a few comments on the issue of energy poverty. Energy access, in my mind, specifically concerns access to modern and affordable technologies. Now, such access is only a starting point, a necessary requirement to get going. It is not sufficient because you also need various end-use appliances ranging across illumination, refrigeration, information, and a whole set of income-generating activities. It is only the first step in the complex process of making real development take off.

Access to electricity is clearly key to the part about income generation. But what about clean cooking fuels and all the rest? This is in fact one area where energy investment would yield immense co-benefits. Currently, women and children in five hundred million households across the globe spend a great deal of their time gathering firewood for cooking, exposing themselves to vast amounts of indoor air pollution in its use. This gives rise to serious health problems and premature deaths; thus, the health and development argument for addressing energy use in these places is just as strong as the environmental one.

In addition, it turns out that when woodfuel is used, usually the conditions are so poor that incomplete combustion tends to occur. This results in emissions of various by-products including black carbon – that is, soot – further exacerbating global warming.

So, what can be done to solve such health and development problems? One solution is biogas production; this has seen large-scale implementation in China, Nepal and elsewhere. Another is using alcohols for cooking; here, there are links to biofuel production. And one might also go for fossil fuels, such as in South America, where liquefied petroleum gas is used very extensively. Before any of you complain that fossil fuel use is not an option, let me add that the warming potential of soot implies that even turning to fossil fuels will actually significantly reduce greenhouse gas emissions from cooking.

In closing, I would like to applaud this investment-approach initiative. I do hope it gains political support.

John Schellnhuber

It really is bizarre, would you not agree? Here we are, talking about forty percent reductions and all the right things, while all across the rest of the conference centre it is all noise and no action. 'Real' politics, it seems, does not take notice, though it should. Indeed, these issues should be discussed in the plenary.

Concerning the feed-in tariffs, yesterday evening I attended a dinner roundtable discussion – although I believe the table was in fact square – organised by the Worldwatch Institute. The topic was, how can the EU, the US and India work together? A somewhat patronising tone pervaded much of the event, as the people from the EU and US kept thinking along the lines of what they can do for India; whereas I kept trying to reverse the order, to get them thinking about what India can do for us. Actually, I believe India can be a role model.

Now, I made the proposal that the US and EU might finance a feed-in tariff for India, accelerating the transition to sustainability and helping India to leave the rest of the world some environmental space by tunnelling, as it were, through the Kuznets curve of carbon emissions. That was my proposal. Considering I am a physicist, it was of course a very naïve suggestion which no one present resonated with

"One of the most promising aspects of the investment proposal is that it is a big-push strategy for meeting multiple objectives at once. It is not just about climate change mitigation."

Thomas B Johansson

and which in all likelihood will fall flat. Yet I personally think it would be the right thing to do.

Sunita Narain

Like the other panellists, I totally agree with this approach. In India we have been raising the same points that John made so eloquently today: the carbon budget and emissions space is limited, and we all need to share it. In order to do so equitably, it means that the North has to cut emissions very rapidly. The responsibility of the South is to start making the transition. Moreover, it needs to do so in a way that it is possible for the North to pay for green investment in the South. The transition will need to be fast enough so that the South no longer needs to pollute in accordance with its fair share of the carbon budget. The South has a right to pollute, yes, but the Earth does not have the space for such further pollution.

Thus, the North will have to pay the South to make the transition. To me, this is the most logical approach to solving the problem; and I used to think that this is what we have been negotiating over the last two years. Now, however, I am starting to think that after Copenhagen all of us should reconsider whether the dialogue of the past years has not after all been one of the deaf and the dumb.

Now, unless we wish to remain at the kindergarten level, we must know that the only way forward is to create an enabling framework that allows the North to reduce emissions while at the same time the South also makes the transition.

I believe feed-in tariffs will be an integral part of that framework. I was not present at the workshop John mentioned, and thus cannot comment on the specifics; however, I do think that the rest of the world really has no clue about how far ahead the developing countries really are willing to move, and are already moving. I am a member of the Indian Prime Minster's Council on Climate Change; two years ago, after thorough internal discussions we agreed to undertake a 'Solar Energy Mission' to increase the amount of solar energy in India. There was enormous excitement. The first concrete figure we came up with was a grand one: a goal of twenty thousand MW of solar energy by 2020.

Then we all sat down together in a newly formed subcommittee to come up with the hard numbers of how to make it happen. After all, forming a target was only a start. The real question was, how would India afford such a transition? And our calculations gave a very clear answer: India would not. As has been argued, really the issue is affordability. No one in India is opposed to solar; no one is saying that this transition is undesirable. We know that there are tremendous opportunities, that there are large parts of the country that are not connected to the grid and thus have the potential of leapfrogging the fossil trajectory altogether. No one should be preaching to us about solar energy.

Yet we need to actually make it work. To me, that is the issue we should be discussing today as a global community. There are constraints to how much energy supply a country can afford. I come from a nation where sixty percent of the population have no energy access. Energy supply is a major challenge; and if you want to increase access, you simply cannot have unaffordable solutions that by their cost limit access even further.

For every kWh of conventional energy, households pay three Rupees fifty. By comparison, the solar feed-in tariff we were setting was seventeen Rupees fifty per kWh. I do not know what this makes in Euros or dollars; just consider the difference. That is the price which would make solar energy not just competitive, but profitable. That is the price we would need in order to kickstart the transition, yet someone will have to pay for the price gap.

Once we performed cost calculations, including an assessment by the Ministry of Finance on how much could actually be allocated to the Solar Energy Mission, we found that the level of ambition had to be reduced. As of right now, our objective is to produce one thousand MW between 2010 and 2013, and four thousand MW from 2014 to 2017. Now,

" I do think that the rest of the world really has no clue about how far ahead the developing countries really are willing to move, and are already moving."
Sunita Narain

this is not bad at all; for a poor country like India to pay the full price differential between conventional and solar energy is a major step.

However, this is the reason why the German approach does not work in India. Germany can afford to pay the full price differential because it has large numbers of paying consumers; the difference in cost can be distributed all across the paying population. India does not have that kind of market structure.

We hope that even with the targets we have, two things could happen. Firstly, in the Mission statement it says that if there is a global fair deal on climate, the one thousand MW target could be ramped up to four thousand. This means that the remaining three thousand MW would in effect be paid for through a kind of global feed-in tariff, because a fair deal would include some manner of transfer from the North to the South.

Secondly, in connection to setting our deadlines and targets we also state that the learning curve of solar technologies may perhaps be steep enough as to allow prices to become competitive before 2020. That is, the cost of our feed-in tariff policy may drop in the future as the price gap between clean and conventional energy narrows.

This is the scheme that, as of right now, is being given the go-ahead by the Indian cabinet. However, the bottom line is that our capacity is limited unless there is a global fair deal in which the North agrees to pay, through a global feed-in tariff, for the transition of the South.

John Schellnhuber's figures on the immense scale of the challenge should really frighten us all. Our response, in the shape of a global fair deal, needs to be on a sufficient scale; yet I am sorry to say that the pitiful amounts and promises that are on the table right now are not.

Svante Axelsson

Elaborating on how to make this thing take off, I would argue that the main challenge is cleverly framing the argument. We all know the poor proposals and alternatives that are out there; in order to eclipse them, we need to sharpen our thinking and our arguments. For instance, the idea of climate policy as 'burden-sharing' is misleading and counterproductive; in reality, it is all about benefit sharing. The easiest way to influence policy is probably to challenge how the issue is being framed by politicians and others; to change their mindset.

Another way to gain support, I believe, is to combine responses to several crises. By combining into a single package efforts on the three problems of eradicating poverty, tackling climate change and stimulating the economy we will be moving beyond burden sharing and creating strategies for win-win-win solutions. A global feed-in tariff would do just that. As we have heard, it would it work to speed up the price fall in renewables. But what I find most interesting about it is how it would fight poverty while at the same time providing strong incentives for investors. High prices for investors, low prices for consumers: that is the crucial element.

Let me also suggest one way to finance such a 'global Marshall Plan'. There are many options relying simply on enforcing the Polluter Pays Principle and collecting so-called double dividends: when taxing emissions, the one benefit comes from the resulting emissions reductions, and the other from tax revenues. For instance, the aviation and shipping sectors are both currently untaxed. If bunker fuels were to be regulated, perhaps twenty or thirty billion USD could be raised annually: a sizable chunk of the funds necessary for a new Marshall Plan. Public consumption patterns also need to change; taxes need to be used in new ways.

From now on, let us talk about investment rather than costs. After all, this is a recipe for a new kind of economic growth that takes us in the right direction. And let us promote policy packages that win allies in as many places as possible. We know enough about the crisis already; the rest is all about framing the issue and finding the package.

"It is not actually a question of burden-sharing, but of investment. You incur expenses today that result in benefits tomorrow."

Tariq Banuri

Tariq Banuri

I firmly believe that John Schellnhuber's points about a limited carbon budget are true. Still, when dealing with complex problems, how one chooses to look at them makes a very real difference for the solution one finds. I often give the example of how during the Great Depression, economists would be advising countries to increase savings rates based on a certain framework for looking at macro-economic problems. And then John Maynard Keynes came along with arguments for other ways of looking at things. He did not change the facts, but he interpreted them in a different way which turned out to be quite helpful.

Similarly, we argue that an exclusive focus on the fixed nature of the carbon budget will invariably lead to conflict over its allocation. Moreover, if nothing is done to change our energy infrastructure, the fixed carbon budget translates into a fixed energy budget. We would then have to fight each other over energy. Our approach is different: we ask, would it be possible through investment to expand the energy budget without affecting the carbon budget? That is, can we convert this problem from a zero-sum to a positive-sum game?

The next step is to find a strategy. What can be done to start off a process that is self-sustaining? An analogy is that if you want to carry water uphill you can put it in a bucket and start walking; but it will not flow uphill by itself. There are a lot of mechanisms out there that are like carrying water uphill: a constant effort being done one percent at a time, or one bucket at a time. Yet the system we should be looking for ought to be more like opening a sluice and letting water flow downhill, carried forward only by the force of gravity. We need a mechanism whereby things start moving by itself.

How can this be achieved? Let me put it this way. There are two main energy approaches on the table here in Copenhagen. One is to make renewables competitive by raising the price of fossil fuels. The problem is that such an approach will devastate developing countries. They cannot afford even current conventional energy prices. Sunita gave an excellent example. If electricity costs eight cents per kWH in a country where per capita income is two dollar per day, and an average individual spends ten percent of income on electricity, how much could she afford? Only two and a half kWh per day; and by any calculation, in order to have a decent standard of living I am willing to bet you will need at least ten per day.

In order to bring electricity use up to that level, we will need to pursue the other main approach, which is lowering the price of renewable energy. This is best done through investing in the expansion of capacity, which in turn is most easily achieved by setting up some kind of global system.

It is not actually a question of burden-sharing, but of investment. You incur expenses today that result in benefits tomorrow. Industrialised countries need to reduce carbon emissions rapidly over the next forty years, to an end state which is as close to zero emissions as possible. If the cost of renewables come down to three cents per kWh, one dollar per W, it would be a 75 percent cut from the four dollars per W price prevailing today. And the investment can be made anywhere needed.

Solar energy, as Sunita explained, costs seventeen Rupees fifty, which is roughly forty cents per kWh. On two dollars per day, how many kWh could you afford? Half a kWh. Governments could support renewable energy to some extent, true; however, they do not have the resources to expand capacity fast enough.

When we put together the WESS report, it was a stated aim to make the analysis as conservative as possible. That is, we tried to find the maximum subsidy cost of making renewables competitive. The figure we came up with was a total cost of 1400 billion dollars. I should point out, however, that my own personal estimate is much less. As incomes rise, the level to which energy prices need to drop also rises; thus, as countries develop, less subsidies will be needed. Within five years, no more subsidies for middle-income countries will be needed; within twelve to fifteen, not even for low-income countries. My own feeling, looking at the potential of many clean

technologies, is that probably the total cost will not exceed 1000 billion USD, spread over ten to fifteen years.

The Centre for Global Development in Washington, D.C. has just done a study on concentrated solar technologies; in it, they argue that once capacity hits twenty thousand MWs, the price will come down to the competitive level of seven to eight cents per kWh. According to them, the extra funds needed for such a push would be only about eighty billion USD, which is notably less than the 1000 billion dollar figure.

In summary, this can be done at costs very much on the same order of magnitude as the amounts that policy makers and negotiators are already discussing. However, it needs to be viewed as an investment, not a burden. Consider the example of mobile phone producer Nokia. They ran a deficit for the first twenty years of their business; had they lost heart at that point and given up, they would obviously not be the world leaders that they are today. We similarly need to run a deficit for the first ten years in order to profit in the future.

Finally, let me just reemphasise that this thing can indeed be done. It really is possible

Johan Rockström

There is little to add. The only thing I can think of, which if anything reinforces Tariq's message, is this. As humanity enters its most decisive decade of its modern existence, as we make the necessary changes, of course there will be insufficient science or evidence to provide unambiguous direction to our efforts. We will simply have to jump into the deep end and learn as we go. And to me, that is just another argument for moving out and testing things at a really large scale.

As if we knew what was going to happen when we set up the Bretton Woods institutions; as if we knew how to rebuild Europe when the Marshall Plan was first initiated. We did not. It is just silly to wait for the standard deviations to get so narrow that no uncertainty remains; it is nonsense. Let us 'tear down this wall', simply.

Interaction with the audience

Remark. Stefan Henningsson, WWF. I wonder if it is not already too late in the game for this idea. Still, I took the liberty of pitching the feed-in tariff idea to the Climate Action Network. There is by now a desperate need to find agreement in the negotiations; and if enough people come together and draw attention to the fact that these eight superstars all find the investment approach a really good idea, maybe we could make a difference?

I know the global feed-in tariff was on the table at the second Bonn meeting. It was present in the actual negotiating text, correct? How come it disappeared off the agenda; will it be nothing more than a placeholder after Copenhagen? How then do we respond? I for one am certainly willing to sign up to any effort for keeping it in, and for immediately drafting a treaty proposal where it is included.

Remark. Niclas Hällström. Quite an urgent and concrete proposal, which is exactly the kind of thing we would like to see come out of our seminar at this critical point in time. Anyone who wants to discuss specifically what can be done to further these ideas in the actual negotiating process, please do stay on after we have concluded. There is still time for making leaps.

Remark. Tariq Banuri. I greatly appreciate your comments, and I really agree we now need to come together. I do hope that Svante and Niclas will be able to assist in this mobilisation.

Remark. Johan Rockström. As I said, tonight at 7.30 we will be releasing at a press conference our 'Copenhagen Prognosis' on the current situation and possible ways forward. Introducing a global feed-in tariff system is actually one of our ten key recommendations. Please come en masse to this event; perhaps we could link up with our friends from the WWF and SSNC and see if we can make any progress. I am very much willing to also reinforce our feed-in tariff recommendation by presenting it as an outcome from this side event and this panel discussion.

Question. My question is for Sunita. I am wondering if the feed-in tariff idea has been discussed in the context of, for example, sectoral CDM? Would you challenge the Prime Minister of India to in fact put this idea down on paper and incorporating it into an official plan for India's low-carbon development: a paper identifying the need for international assistance as compared to domestic capability? The fact that Indonesia, Mexico and others have created such documents has been very helpful; outlining what Southern governments can and cannot do on their own has challenged Northern governments to respond.

Answer. Sunita Narain. This is of course a very good idea. However, India has already done so in putting up its carbon intensity target. The Indian National Action Plan, which includes solar development, is a domestic plan; one which I believe should also be included as a Nationally Appropriate Mitigation Action, or NAMA.

I cannot honestly see how anyone could be expecting more from India today. I think what the world should be waiting for is what President Obama will be bringing on Friday. If he brings nothing, we should send him home at once. There is far too much focus on India and China, despite us in fact getting our act together.

Underlying your question, I think, is the unfortunate assumption that we are not doing more because we do not want to. In negotiations like these, distrust and unwillingness to take serious action is everywhere. Even what we are doing at home is constantly being undermined. But yes, we will definitely be pushing this proposal, and it will be part of the NAMAs.

Question. I too was very impressed with the report. I wish to ask Mr. Banuri this: as head of one of the key DESA divisions, how would you utilise the UN system to promote these ideas?

Answer. Tariq Banuri. The UN plays several different kinds of roles, one of which is the technical and analytical role. We

provide advice to countries, facilitate informed discussions and capacity building. Primarily, this is the function we played at DESA in putting together our report: trying to bring knowledge together and convert it into policy suggestions.

The thing is, however, that you also need people ready to take your work forward from there. To some extent, this is something the UN system can manage through its own processes. Yet there is really no alternative to disseminating our research to governments; and so, that is what we are doing. But really, the report is meant for everyone.

Remark. Lars Rydén, Uppsala University Centre for Sustainable Development. I wonder what part local initiatives could play in the kind of process you have mentioned. There are so many municipalities and communities around the world that really want to act; and so many of the things we need to do are already economically viable.

Only yesterday, I came across a joint project of the Netherlands and UNEP for installating solar heat facilities in Tunisia. One conclusion was that banks need to be more knowledgeable about new technologies in order to be willing to give out loans. Also, the role of organisations like UNEP should be to provide information as well as political, technical and scientific support rather than banking services.

The most crucial lesson, however, was that after one thousand such projects, the entire process became self-sustaining; water going downhill, as you say.

Remark. Tariq Banuri. That self-sustaining threshold is what it is all about. Our calculations are based on the assumption that increased capacity is the key variable for reaching that point, and the question we ask is how big a push is required to get over the bump: over the tipping point. We only need to escape the 'us-versus-them' sensibility which seems to be thwarting cooperation in the negotiations. This is an investment: a cooperative investment to reach joint objectives.

The Swedish Society for Nature Conservation's views on the climate change negotiations – as formulated before COP 15 in Copenhagen

December 7, 2009

When the countries of the world meet in Copenhagen from December 7 to 18 for the annual Conference of Parties (COP), the Bali Plan of Action 2007 is to be finalized through legally binding decisions within the two parallel negotiating tracks: industrialized nations' (Annex 1 countries) binding mitigation efforts under the Kyoto Protocol (KP) and the five distinct sub-issues within the working group known as the "Long-term Cooperative Action" (LCA) – financing for developing nations, technology transfer, adaptation, mitigation and a common long-term vision.

One week before the conference the situation appears grim, with way too insufficient ambitions on behalf of the industrialized nations. There is a deeply concerning and growing gap between what is seen as "politically feasible" and what is deemed necessary according to science.

This document presents the views of the Swedish Society for Nature Conservation on some of the most critical issues to be discussed in Copenhagen, and addresses the positions of Sweden, the EU and other countries.

The UNFCCC negotiating process and the conference in Copenhagen

Since the negotiations in Bangkok in October 2009 the Kyoto Protocol's survival and the downplaying of expectations for the climate change conference in Copenhagen have become central to the debate. Sweden, the EU and most of the other industrialized nations have been sharply criticized by developing nations and international environmental and solidarity movements for intending to sacrifice the existing, legally binding framework (the Kyoto Protocol) and opening the possibility of a "race to the bottom" by deferring too much to the unambitious conditions presented by the United States.

The Swedish Society for Nature Conservation maintains that:

- The Kyoto Protocol is currently the only legally binding agreement we have for emission reductions. Until another stronger and better agreement including legally binding aggregate emission reduction targets for industrialized nations, sanctions mechanisms and clearly defined calculation methods for emissions exist, the Kyoto Protocol must be preserved. Sweden and the EU must show leadership by defending the Kyoto Protocol and allowing the US to participate through the convention track until it is prepared to sign a legally binding climate treaty.

  Comment: Since the Bangkok negotiations in October 2009, the EU has instead called for a so-called 'single treaty,' which would unavoidably become a very weak treaty where the important principles of division of responsibility would be watered down. Rather than pushing the Annex 1 countries towards the most ambitious emission reduction efforts possible, focus seems locked on getting the US to participate in an new legal instrument, despite the fact that the US currently refuses to accept the principles (aggregated, legally binding emission reductions with clear sanction mechanisms)in the Kyoto Protocol that the EU claims to guard. By advocating such a 'single treaty' EU encourages other Annex 1 countries such as Canada and Australia to 'jump ship' and opt for US style national pledges, (i.e voluntary targets that are neither aggregated nor internationally binding) rather than defending the Kyoto protocol's aggregated emission reductions.

  Developing countries view a 'single treaty' as a major provocation and an abdication of EU leadership. Instead of leading, the Annex 1 countries choose to cede responsibility. This approach widens the trust gap between north and south, and decreases the readiness of developing countries to take on their own commitments.

- Maximum pressure to achieve a legally binding agreement in Copenhagen must be sustained.

  Comment: The EU, US, Ban-Ki Mon and the head of the UNFCCC secretariat have played down expectations for Copenhagen and argued that a legally binding agreement is not possible. Both Reinfeldt, the Swedish Prime Minister, and Rasmussen, his Danish counterpart, have actively stated this view in public. Developing countries and environmental organizations insist on the necessity of a legally binding agreement and remain sharply critical toward the current downplaying of expectations.

- Should a binding agreement in Copenhagen be impossible to achieve, an extension of the Bali Road Map must be the primary strategy. This would mean that negotiations would continue along the two current tracks: the KP working group which includes the industrialised countries with established targets under the Kyoto Protocol, and the LCA track which also includes the US. The two parallel negotiation tracks would thus continue, with clear commitments to continue negotiating and conclude the Kyoto Protocol's second commitment period targets.

Comment: There is a risk that the wealthy nations of the world will attempt to push through a 'new' mandate for continued negotiations towards a 'single treaty', which would threaten the Kyoto Protocol. All developing nations, including China, are categorically opposed to this. The Dansish proposal currently include both a Kyoto and LCA track. The Swedish EU presidency still has the possibility to actively defend the Kyoto Protocol.

Shared vision

Climate change is, in its deepest sense, an issue of development and justice. It is impossible to successfully deal with the threat of climate change without simultaneously addressing questions concerning historical responsibility, energy poverty and the enabling of alternative development paths in all countries, north and south.

The Swedish Society for Nature Conservation maintains that:

- The average global temperature increase must be limited to a level as far as possible below two degrees Celsius. An increase of two degrees means significant negative consequences along with a risk of threshold effects and runaway climate change. A goal to stay below 350 ppm of carbon dioxide (400 ppm carbon dioxide equivalents) is likely necessary. Ambitious, continuous reductions beginning as soon as possible is needed to achieve this aim. From the perspective of climate change, it is the total, accumulated quantity of emissions that counts. Every lost year with continued, high emissions therefore consumes the limited remaining carbon budget. The global emissions trend must peak and turn downward within 5-10 years, with total reductions of 90 % by 2050 if we are to have a reasonable chance of remaining below the two-degree limit.

Comment: The Alliance of Small Island States (AOSIS) and the Least Developed Countries (LDCs) demand long-term targets set as far below 350 ppm carbon dioxide equivalents and a 1.5 degree temperature increase as possible. They maintain that global emissions must be reduced by 85 % by 2050, together with Annex 1 reductions of more than 95 %.

The Swedish government has decided on a 400 ppm carbon dioxide equivalent goal in its climate action proposition, but refrains from promoting corresponding emission reduction targets internationally.

All industrialized nations, including Sweden and the EU, are well below this ambition and view as sufficient global emission reductions of 50 % by 2050. This goal is nearly double the volume of emissions between 2010 ans allowed between 2010 and 2050 in order to have a 50% chance of keeping below 2 degrees, and is nearly three times the volume allowed for a 350 ppm target. The rhetoric of the 2-degree goal is thus not matched by the necessary global emissions cuts proposed by industrialized countries.

- Climate change must be tackled through three parallel efforts:
  1. maximally ambitious domestic emission reductions (mitigation) in Annex1 countries;
  2. support for, and enabling of, emission reductions (mitigation) in developing countries;
  3. support for adaptation in developing countries.

  The "shared vision" must reflect all these components.

Comment: Most industrialized nations see only temperature targets (e.g. two degrees) and emission reduction ambitions for 2050 as the shared vision. Developing nations point out that 'residual efforts', given the rich countries' unambitious efforts, would then fall on them and mean nearly equal per-capita reductions (taking into account population growth) for their own population as for those of industrialized nations – a fact seen as deeply unjust. Developing nations maintain that the right to development through financing and technology must be secured as integral parts of the shared vision, and must be of equal importance as emission reduction targets.

Emissions reductions (mitigation) under the Kyoto Protocol

The primary objective of the Kyoto Protocol is to limit the emissions of greenhouse gases from wealthy nations (Annex 1 countries) through a legally binding protocol, that includes sanctions mechanisms.

The Swedish Society for Nature Conservation maintains that:

- During the Kyoto Protocol's upcoming second commitment period, Annex 1 countries must undertake legally binding, aggregated domestic emission reductions of at least 40 % by the year 2020. Any targets less ambitious than a 40 % reduction by 2020 will result in the need for difficult and considerably more costly reductions later. If

Annex 1 countries refuse to take on targets of this magnitude, the second commitment period should be limited to as short a period as possible: 4-5 years, rather than 8, so that more ambitious targets can soon be formulated, and so that the next IPCC report can be used as a basis for increased ambitions.

Comment: LDCs and AOSIS demand 45 % emission reductions in Annex 1 countries by 2020. Boliva demands 49 % reductions in Annex 1 countries by 2017, without the use of offsets. As a group, G77 demands Annex 1 efforts amounting to at least a 40 % reduction by 2020.

The industrialized nations have thus far failed to succeed in agreeing upon any aggregated target despite a deadline for this, which passed in March 2009. Although negotiations concerning a second commitment period for the Kyoto Protocol have been pursued since 2005, little has been achieved beyond statements on what is seen as politically possible in each respective country. In total, the Annex 1 countries have presented ambitions amounting to 16-23 % reductions, compared with 1990 levels (with Norway leading at -40 % and Canada trailing with -3 %). Accounting for the most likely efforts from the US (-4 % compared with 1990 levels), the industrialized nations' combined reductions would amount to 11-18 %. Common to the majority of industrialized nations is the intention to meet a significant proportion of their reductions in developing nations through offset projects.

The EU claims to be leaders and most ambitious, but remains with its 20 % reduction on par with Switzerland and below both Norway and Japan. Even with the promised increase to 30 %, in case there are "comparable efforts" by other countries, this is still far less than what is necessary. On November 25, 2009 the EU Parliament challenged the EU presidency and the European Commission by passing a resolution stating the need to commit to the 30 % benchmark regardless of the actions of others, along with the need to strengthen EUs ambitions to a level of 40 % without offsets.

- Ambitious domestic emission reductions are positive for industry and competitiveness, and are welcomed by a large number of companies. Over 220 CEOs of both small and large companies have signed the Swedish Society for Nature Conservation's "Climate Relay", which demands 40 % emission reductions *within* the industrialized nations and that these countries dramatically increase their support, in addition to foreign aid, for climate efforts in developing nations.
- Regardless of what actions are taken by the rest of the world, the EU will benefit by accepting as soon as possible a reduction target of 40 % within the EU by the year 2020. In case the EU does not see itself able to establish these needed frameworks for companies and individuals now, it must at least take as a first, modest yet important step the move from a 20 % reduction to 30 % by the time of the Copenhagen conference. These emission reductions must take place entirely within the EU.

Comment: The EU has stated that when it increases its emission reduction targets from 20 to 30 %, three percent-units of this ten percent-unit increase would be allowed to incorporate carbon reservoirs in the forests (LULUCF). An additional five of the ten percent-unit increase could be accomplished through offsetting. If these rules were applied to their full extent, the EU could actually reduce its emissions by as little as 2 additional percent-units, despite the official ten percent-unit figure. Sweden supports this course of action in which as much as eight of the ten additional percent-units are allowed to be accomplished through LULUCF or offsetting.

Loophole #1: Offsets

With targets of less than 40 % reductions by 2020 for Annex 1 countries, offsets have no place in the negotiations. The tranformation within Annex 1 countries cannot be delayed by allowing industry in rich countries to postpone or avoid mitigation action though off-sets. While enormous efforts and investments are needed to enable climate-friendly development in developing countries – these efforts need to be pursued above and beyond the reductions to be achieved by industrialized nations themselves.

Comment: LDCs demand 45 % reductions without offsets for Annex 1 countries.

The EU's energy and climate package enables the use of flexible mechanisms (offsets) to account for more than 50 % of their reduction efforts.

National legislation being proposed in the US is based on a substantial amount of offsets, not the least forest projects in developing countries. In practice, the current national legislation being proposed in the US is thought to offer so many possibilities for the use of offset credits that the country would not be required to make any domestic industrial emission reductions for nearly two decades.

Loophole #2: Hot air

A well known mistake was made in the Kyoto Protocol. Some countries were allowed emissions rights far in excess of their current emission levels. This meant that countries such as Russia and the Ukraine were not compelled to reduce their emissions. If these unused emissions rights (AAUs) are carried over into the coming second commitment period of the Kyoto protocol, they will add what has been called 'hot air.' If the maximum amount of AAUs from hot air would be used, the current mitigation ambitions for 2020 (as suggested by the industrialized nations in October), could in reality mean as little as 6 % reductions compared to the year 1990. This is just one percent in addition to the existing targets established by the Kyoto Protocol for the year 2012.

- It should no longer be possible to carry over excess emissions rights (AAUs) into coming commitment periods.

Comment: Sweden has pressed the EU to work internationally for a sharpening of the rules regulating hot air. The EU, however, has not succeeded in agreeing upon a stricter approach, largely due to several Eastern european countries who view their hot air as a rightful asset. Russia, with the support of the Ukraine, argues that the issue of hot air is a decisive issue, and has previously been prepared to block negotiations in order to promote its national interests.

Loophole #3: Use of land and forests (LULUCF) by Annex 1 countries

Land Use, Land-Use Change and Forestry (LULUCF) is used within climate negotiations for the purpose of calculating carbon reservoirs, i.e the carbon dioxide that is trapped within forests and soils, or that is released through logging. According to the suggestions currently on the table, up to 8.7 % of the EU's emissions and up to 9.2 % of industrialized nations' emissions could be compensated for by carbon reservoirs. This is an unacceptable formulation of LULUCF rules.

The Swedish Society for Nature Conservation maintains that:

- Industrialized nations need to reduce their emissions from industry, energy, transportation, etc. and should not use carbon reservoirs in their calculations regarding emission reduction targets.

- The use of carbon reservoirs must be limited due to the scientific uncertainty of the significance of their actual benefits in terms of global climate change.

- LULUCF regulations must be formulated in a way that minimizes possibilities for countries to calculate as part of their emission reductions carbon stored in forests, maintained through land use, bound in harvested wood products, etc.

- The reference level must be a historical reference level, not a flexible reference level to be determined by the countries themselves.

Comment: The EU argues that business-as-usual should be used as reference level, and that only carbon dioxide uptake should be counted, not emissions. Heavily forested countries such as Sweden, Finland and Austria promote a LULUCF approach that decreases incentives for significant emissions reductions from industrialized nations in terms of transportation, energy and industry.

Mitigation for developing countries and the right to development

The ambition to limit emissions in developing countries is intimately connected to the insight and principle that the necessary conversion to fossil-free societies can not compromise the right to development, and that the wealthy Annex 1 countries have a responsibility to pay for and enable a low carbon/fossil-free development path.

The Swedish Society for Nature Conservation maintains that:

- Developing nations must make all possible efforts to steer their societies towards sustainable development and to reduce their relative climate impact in relation to the size of their economy (GNP). Countries with extremely low per-capita emissions must be allowed to increase their emissions over a longer period of time. Developing nations with a higher level of per-capita emissions must soon reduce their net emissions – and do so drastically over the coming decades – while at the same time their per-capita incomes rise several-fold. International cooperation, technology and, not least, financial resources are necessary to make this possible. Developing nations must accept demands for formulating ambitious Nationally Appropriate Mitigation Actions (NAMAs) and be evaluated according to their actions in relation to received financial and technological support from Annex 1 countries. Developing nations shall not, in accordance with the climate convention, be subjected at this point to absolute, binding emissions reductions.

Comment: The EU and several Annex 1 countries demand reduction efforts of 15-30 % in relation to business-as-usual scenarios for developing nations.

The US places demands on particularly China to accept conditions similar to their own, despite the enormous difference in per-capita emissions, income levels, poverty and historical responsibility.

All developing countries, including China and India, oppose binding demands for emission reductions based on the climate convention's principle of "common but differentiated responsibility."

During recent weeks, an increasing number of developing countries have declared new ambitions for emission reduction efforts, which has had positive influence on the negotiations and puts increased pressure for more ambitious actions from Annex 1 countries. South Korea has committed to 30 % reductions by 2020, compared to the business-as-usual (BAU) curve. Brazil has declared similar reductions of 35-39 %, and China has notified that it intends to reduce emissions by 40-45 % per GNP unit by 2020.

- An ambitious "Marshall Plan" for climate and development is necessary in order to transform within a sufficiently short period of time to fossil fuel-free societies, while simultaneously tackling issues of development and poverty. Through an offensive, time-limited public investment effort ('Green Energy Revolution'/'Global Green New Deal'/'Global Marshall Plan'/'Big Push') focusing on renewable energy through feed-in tariffs in developing nations, energy can be made available to many of the 1.5 billion poor who today lack access to electricity. At the same time, an infrastructure based on renewable, fossil fuel-free energy would be constructed and costs for currently expensive renewable energy be rapidly pushed down to competitive levels –which would also benefit industrialised countries.

Comment: The ideas for this 'Green Energy Revolution/Big push for renewables' strategy have been formulated by the UN Division for Sustainable Development in the Department of Economic and Social Affairs, and are gaining increasing support among countries and NGOs. This investment approach contrasts with the dominant focus from the EU and Sweden on carbon trading and raising the price of carbon through carbon taxes. These tools may serve a purpose but have marginal influence when it comes to contributing to increased access to (clean) affordable energy for the poor, and will fail to generate a drastic reduction in the costs of renewable energy. Rather, these objectives require substantial, front-loaded public investments over a limited period of time.

Division of responsibilities

The division of responsibilities and actions between various countries is a key issue in the climate negotiations.
The Swedish Society for Nature Conservation maintains that:

- Efforts to tackle climate change must be based on the climate convention and its principles of "common but differentiated responsibilities" and the industrialized countries' (Annex 1 countries) obligation to contribute "full agreed incremental costs" for adaptation and mitigation efforts of developing countries.

Comment: The question of historical responsibility has received increasing attention during the past six months. More than 50 countries, with Bolivia and others in the lead, have introduced to the negotiations the concept of 'climate debt', a method of quantifying Annex 1 countries' historical over-use and continued over-exploitation of the limited remaining climate space. In financial terms, this debt would amount to many trillions of US Dollars.

Annex 1 countries oppose the use of climate debt and do not see historical responsibility for any period more than a few decades back in time as relevant for assessing the division of responsibility.

Certain industrialized nations such as the US are attempting to reformulate the key principle of the climate convention from "common but differentiated responsibilities" to "common and shared responsibilities." In this approach, the differentiation between Annex 1 and non-Annex 1 countries would become blurred. This is seen by developing nations as a serious threat, a fact which contributes to the low level of trust between developing and industrialized nations.

- A principle-based division of responsibilities must be based on historic emission levels, the capacity to finance and carry out emission reductions, per-capita emissions and income levels. Over time, emission levels must be tied to consumption, rather than where goods are produced. Industrialized countries, which have historically produced the highest levels of emissions and continue to do so, must take greater responsibility for reducing emissions domestically and for supporting climate-friendly development of developing nations.

Comment: Industrialized nations are attempting to include the largest developing nations (China, India, Brazil, etc.) in binding commitments but without arguing from clearly defined principles.

India is often portrayed, for example, as an advanced developing nation without an evident right to increase emissions in the coming years, despite emissions of just one ton per capita and many hundreds of millions of people living in poverty. China is often portrayed as being more problematic than the US despite relatively low per-capita emissions, low historical emissions and the fact that a large proportion of the country's emissions are caused by goods consumed in industrialized nations.

Developing countries claim that Annex 1 countries must first assume their long overdue responsibilities enshrined in the climate convention from 1992 and deliver ambitious measures and efforts before any new division of responsibility is negotiated. If a new division of responsibility is to be developed it must follow clearly defined principles based on fairness, the right to development and historical responsibility.

Financing of climate efforts in developing countries

The financing of climate efforts in developing countries must be based on a full recognition of the principles of the climate convention, as well as on the principles for division of responsibilities described above. Financing shall not consist of new loans, but of direct transfer of resources.

The Swedish Society for Nature Conservation maintains that:

- Efforts towards adaptation likely require several hundred billion USD per year, a sum that will increase over time.

- The need for investment in emission reduction measures and transition to renewable energy are larger in early phases, but will gradually decrease as the costs of renewable energy are reduced through economies of scale (see the point on a global Marhall plan and feed-in tariffs above). The need for public investments for global feed-in tariffs would likely amount to at least a hundred billion USD per

year during 10-15 years, starting as soon as possible. Additional financing will be required for the transformation of other sectors, such as transportation.

- In total, public finance for developing countries is likely needed at a level of at least USD 500 billion a year – and beginning within the next few years rather than 2020 or 2030.

Comment: China and the G77 suggested as early as in June of 2008 that 0.5-1 % of Annex 1 countries' GNP should be contributed to a new, global climate fund under the climate convention (UNFCCC). This would amount to approximately USD 200-400 billion per year.

Several studies and reports have recently indicated that costs will likely be much higher than previously estimated: One International Institute for Environment and Development (IIED) study led by a former chairman of the IPCC concludes that the UNFCCC's Secretariat previously underestimated adaption costs by 2-3 times; The UN-DESA report states an annual need of USD 500-600 in public financing.

The Africa Group has recently updated its figures, claiming that 5 % of the GNP of Annex 1 countries should be contributed to climate financing.

The EU is one of few industrialized nations that has so far expressed its view regarding financing. EU assesses the total cost of adaptation and mitigation measures – including both public and private investments – as up to EUR 100 billion per year until 2020. Of this amount only EUR 22-50 billion would consist of public financing, with the EU share only EUR 2-15 billion.

The European Parliament's resolution from November 25, 2009 challenges the EU presidency and the European Commission by recommending EUR 30 billion per year beginning by 2020, and that developed countries should earmark a certain percentage of their GNP for a renewable energy cooperation fund, in addition to their existing foreign aid. The US has not yet recognized any need for public financing, suggesting instead voluntary contributions.

- Foreign aid must not be double counted as climate financing. All climate financing must be *in addition* to the 1 % Swedish target for foreign aid (0.7 % internationally).

Comment: The EU has not yet manifested this important principle for ensuring that the poorest populations are not held responsible for paying the bill for climate change. At the European Council's meeting in October, Great Britain and the Netherlands proposed a requirement for 'additionality', a proposal which failed to generate sufficient support. Sweden did not express its support for the additionality principle.

- Carbon trading involving non-Annex 1 countries do not generate new financial resources. These investments are in fact used in order to reach reductions in Annex 1 countries that would otherwise need to be achieved within these countries. Benefits to the climate are the same (in the theoretical best-case scenario) as if the measures had been taken in respective Annex 1 country. Offsets can therefore not be counted twice as also financial support for reducing emissions in developing nations.

The EU argues for a double counting of carbon trading investments, and argues these should constitute part of the European climate financing for developing countries.

- Subsidies for fossil-based energy must cease immediately and be redirected towards renewable energy. Today's subsidies for the fossile fuel industry amount to USD 235 billion – a considerable proportion of the support needed to finance climate-friendly development in developing countries.

- A mix of financial sources is reasonable, including direct contributions from national budgets, levys on air and sea transportation, taxes on international financial transactions, surpluses from carbon trading in Annex 1 countries (e.g. from auctioning of emission rights) and auctioning of emission quotas. Financial sources which are doubly beneficial, such as levys/tariffs on air and sea transportation, which also have environmental and climate benefits, should be favoured.

The EU has discussed, but not yet actively promoted measures concerning levys on international air and sea travel as a source of financing.

Norway has suggested that a portion of the emission quotas is to be auctioned out.

Several countries within the EU oppose earmarking of auction proceeds.

- It is important that the financing mechanisms and the institutions supporting them are governed collectively by all countries, according to the guidelines agreed upon in the climate negotiations. They should therefore be placed directly under the climate convention, rather than by "donor-driven" development institutions such as the World Bank.

Comment: China and the G77 countries have suggested that a global fund with several windows (adaptation, mitigation/ renewable energy, technology, REDD) is to be established under the UNFCCC, with the structure and experiences from the Montreal Protocol as a model.

The EU opposes the creation of new institutions and maintains that much of the financing can be distributed through existing channels and institutions, where the World Bank should play a leading role.

- These financial needs are substantial, but manageable. They likely amount to no more than a few percent of global GNP and are in absolute figures much less than the cost of actions taken during the recent financial crisis.

The world's forests: REDD

Logging of forests and changes in land use amounts to nearly one-fifth of the world's carbon emissions. The causes of deforestation must therefore be identified and tackled. For lasting effects, issues such as democracy, governance, land-use rights and appropriate economic incentives for sustainable use of forests must be addressed. Industrialized countries must carefully analyze how their trade and agricultural policies affect the world's forests, reduce their demand for products that lead to deforestation and ensure that the investments of their companies do not contribute to the ongoing forest destruction.

The Swedish Society for Nature Conservation maintains that:

- REDD should not be tied to carbon trading. REDD must be developed with great caution and not be seen as a quick and simple measure. At its core, it should be a fund-based system that can answer to real, integrated needs rather than narrow market interests.

- All efforts must be based on meaningful consultations and enable real influence for the forests' local communities and indigenous peoples in identifying solutions where they will benefit.

- REDD policies must explicitly ensure that natural, forests are preserved and that incentives for deforestation and plantations/monocultures are not created.

Technology – develop smart solutions; prevent new problems

Technology is a central component in tackling the climate crisis. However, it is also a double-edged sword: choosing the wrong technological solutions can worsen the current situation and create new problems for both public health and the environment.

The Swedish Society for Nature Conservation maintains that:

- Significant efforts and investments should be focused on renewable energy, such as solar- (e.g. photovoltaic cells and concentrated solar energy), wind- and wave-generated energy.

Comment: UN-DESA claims that the costs of renewable energy (sun, wind, etc.) could be reduced through an offensive 'Big push for renewables' investment program, using measures such as feed-in tariffs. The organization argues that these costs can be reduced to levels capable of being more competitive than fossil fuels within a 10-15 year period.

- Explicit wording on the need for precaution and risk analysis /technology assessment need to be included in the technology section of the negotiation texts.

Comment: In the current negotiation texts, there are no formulations regarding the precautionary principle and the need for technology risk assessment.

- Nuclear power is a costly and too risky technology, and should be phased out as soon as possible in favor of renewable energy. CCS is an uncertain, unproven and expensive alternative, and should not be allowed to crowd out more sensible, renewable alternatives.

- New, large-scale technological modifications of the Earth's oceans, land and/or atmosphere intended to address climate change – so-called 'geo-engineering' – are inherently risky and would likely create new global problems. Geo-engineering is not part of the solution to the climate crisis and must not be allowed to take focus from the measures that are necessary.
-

Adaptation

Too many of the adaptation measures that are currently discussed are based on a 'techno-fix' perspective in which infrastructure such as levees, water diversions, increased irrigation, development of drought-resistant GMO crops etc. are perceived as effective measures.

This approach risks disturbing the natural resilience of ecosystems and complicates efforts by local communities to shape their own adaptation strategies. Participation by all involved must serve as the foundation for all processes and adaptation strategies and programs must be formulated from a perspective of equity. People must be encouraged, supported and be permitted to preserve and improve their local ecosystems in a way that promotes their self-sufficiency and adaptation capabilities, for example by protecting natural wetlands and promoting access to food and livestock feed.

Biodiversity plays an important role in maintaining an ecosystem's capacity for coping with disturbances and changes, since a broad diversity of species means that individual species can replace and complement one another in situations such as drought or other climate change-related environmental changes, thereby preserving the ecosystem's carrying capacity.

The Swedish Society for Nature Conservation maintains that:

- Strategies for financing of adaptation should focus on the most vulnerable groups and actions that protect nature's capacity to provide ecosystem services for poverty reduction, biodiversity and adaptation.

- Financial support for adaptation must increase dramatically, and constitute a considerable share of the several hundred billion USD yearly that are needed for coping with climate change in developing countries. Finance for adaptation must be additional to regular foreign aid.

Climate change:
Follow-up to the 2009 Copenhagen conference

Extract from:
The Swedish Society for Nature Conservation Submission with comments and views on issues to be deliberated at the EU Environment Council meeting, 15 March 2010.

9 March 2010

Extract from the Swedish Society for Nature Conservation's views on issues to be deliberated at the EU Environment Council meeting on 15 March 2010. Submission 9 March 2010.

Item 3. Climate change: Follow-up on the Copenhagen conference (7-19 December)

In order to turn the failure in Copenhagen into something positive, the EU needs to reevaluate its positions considerably.

The Swedish Society for Nature Conservation maintains that EU needs to:

- Aggressively strengthen its own mititation commitments and unilaterally commit to 40% emmissions reductions by 2020 compared to 1990, without using off-sets. An absolute minimal requirement is to immediately strengthen commitments to 30% as a first step.

- Ensure that enviornmental policies define the framing of EU's other policy areas, for example through a strengthening and further development of an "eco-efficient economy", where the three-legged climate goals together with the goals for biological diversity etc. create the basis for EUs 2020 strategy and EUs economic growth and industrial policies.

- Evaluate the 2 degree target and possibly sharpen this goal. The implications of temperature targets must be translated into goals that are consistent with science, entail an acceptable level of risk, and respect the principles of common but differentiated responsibilities. This means global mitigation targets need to amount to at least 90% by 2050, *coupled* with financial and technological support that enables climate smart development in developing countries and that compensates for overuse of climate space by the industrialised countries – and which meet the needs for adaptation in developing countries.

- Provide considerable public financing in line with the above (EU's proportion of at least USD 500 billion per year as soon as possible), and ensure that these are new and additional resources beyond the 0,7% target (1% for Sweden) in foreign aid, and that these financial resources should be governed in a way that is acceptable to the developing countries receiving the funds.

- Take new, bold approaches and work for a solutions-oriented policy with real win-win potential, that can also rebuild trust between developing and developed countries. SSNC encourages Sweden and EU to pursue the idea of a global Marshall plan coupled with a global energy/mitigation fund under UNFCCC where feed-in tariffs for renewable energy could, simultaneously, tackle energy poverty of 2 billion people, quickly reduce costs for renewable, fossil free energy for both rich and poor countries, and stimulate the develoment of green jobs in both North and South. This would be a true investment streategy where substantial public resources effectively move even larger private investments in the right direction under a limited time period.

- Actively explore and support the establishment of innovative funding sources such as taxes on sea and air transportation, and on financial transactions.

- Acitvely promote the precautionary principle and the need for technology assessments so that new, serous health and environmental problems can be avoided, particularly considering the risks of geoengineering.

- Take into consideration the valuable conclusions and reommendations for adaptation put forward by the Commision on Climate Change and Development. Follow up and revise EUs financial commitments for adaptation as assessments of needs change (and increase) over time. Ensure that adaptation measures are not pursued at the

expense of other important development activities and actions aimed at poverty reduction, i.e. that they are additional. Ensure that financial support is grant-based and does not lead to increased debts.

Considering the process towards Cancún, SSNC argues that Sweden and EU should:

- Strongly support and pursue the negotiation process within the UNFCCC framework. Confront countries, particularly the US, but also e.g. China, who are not actively pursuing the demand for a binding agreement.

- Ensure that the two working groups (LCA and KP) reassume their work based on the chairpersons' negotiation texts as presented to the COP, and continue their work based on the mandate they have had since Bali (i.e. to continue negotiations on the second commitment period of the Kyoto protocol and the five themes under LCA).

- Respect and pursue the basic premises of the AWG-KP on mitigation that has been in place since Bali, i.e new binding commitments for Annex-1 countries by 2017 or 2020, in both aggreagated and country-specific form for the second commitment period of the Kyoto protocol, while the US makes comparable commitments under the convention track through a COP decision or other instrument, and that the developing countries take on ambitious commitments, enabled by finance and technology (that are measurable, reportable and verifiable – 'MRV').

Considering the so called Copenhagen Accord, SSNC maintains that Sweden and EU should:

- Distance and disassociate themselves from the document, due to both the unacceptable and insuffient content, and to the undemocratic and non-transparent process behind the document.

- Regard the document as one of many inputs by parties that are outside of the formal UNFCCC texts, recognising it was only "taken note of " by COP 15.

- Forcefully reject any attempt to (automatically) insert the Copenhagen Accord elements into the existing negoatiation texts.

- Condemn attempts (not least by the US) to make countries' association with the accord a condition for receiving climate finance support. This is contrary to the principles in the climate convention and is a gross overstep. Sweden and EU must actively counter any attempt to exert power in dishonest ways to pressure counties to associate with the accord.

- Demand that the UNFCCC secretariat functions in a neutral and facilitative manner, and does not actively promote the accord in the interest of only a limited number of parties. This also applies to the UN Secretary-General Ban-Ki Mon. Sweden and EU must also help ensure that the new Executive Director of the UNFCCC secretariat is a person with strong integrity, is grounded in the climate convention, has as much development as environment background, and is trusted by both developing and Annex 1 countries.

Save the Kyoto protocol! Take leadership!

"Reinfeldt should pressure US"

"Prime minister Reinfeldt can as the leader of the European Union move negotiations forward; instead he plays down the expectations for Copenhagen. A unique political momentum is being squandered because EU is waiting for USA, Svante Axelsson, Swedish Society for Nature Conservation and Lasse Gustavsson, WWF writes."

For more than a hundred years increasing emissions of greenhouse gases has impacted on the earth's climate. Now, humanity has perhaps five years to turn these increases to decreasing emissions. The importance for the world's countries to deliver a just, ambitious and binding agreement to reduce emissions of greenhouse gases at the UN summit on climate change in Copenhagen in December can not be exaggerated. The ambition to keep the global average temperature increase below two degrees is a must.

The road to Copenhagen has shown global cooperation and major scientific unity. But will it be enough?

Over the last few days the EU presidency leader Fredrik Reinfeldt has signalled that, despite countries having negotiated a new commitment period for the Kyoto protocol for three years, he now wants to give this up as it is not possible to get the US on board. The developing countries are, for good reasons, very upset. This way, the only legally binding guarantee that industrialised countries will decrease their emissions would be thrown away, before any possibly new and better future system is in place.

It is provoking when Reinfeldt in media argues that not even poor India, with just about one ton per capita in emissions, can assume a right to increased emissions. This borders cynicism and further undermines the trust between north and south that already is very weak. Surely India and China should also decrease their emissions, but until 2020 this is mainly about substantially reduce the emission increases. What level of ambition the developing countries are prepared to accept is intimately coupled with the level of support that the industrialised world can provide to adaptation and transition to renewable energy in developing countries.

Apart from a second commitment period for the Kyoto protocol, the Copenhagen meeting therefore needs to agree on substantial support to the developing countries. As decided in Bali two years ago the Copenhagen process is about two separate agreements. It is astounding that Reinfeldt gives up the Kyoto process in his political rhetoric, something which means that the possibility for EU to form the necessary alliances with other countries in the lead up to Copenhagen becomes more difficult. Cooperation between countries has historically been decisive for success, and will without doubt be of great importance for success in Copenhagen.

A unique political momentum is being squandered as the EU Heads of state choose to trust the American leadership,

Translated version of an op-ed by the Swedish Society for Nature Conservation (SSNC) and World Wildlife Fund, Sweden, published in the Swedish daily newspaper Svenska Dagbladet on 12 November 2009 www.svd.se/opinion/brannpunkt/artikel_3787511.svd

despite knowing that President Obama is constrained by the US domestic legal process and despite the fact that USA today is far from the ambitions that correspond to its responsibility. We now risk a 'race to the bottom' that resembles a tea party where countries just announce how much they are willing to commit – without legally binding rules.

More effort should be directed to building trust and creating alliances with strong parties with ambitious climate policies among the developing countries. If EU wants to, it can together with countries in G77 put pressure on the US to provide concrete offers in Copenhagen.

Yet, with a lack of US domestic laws in place, it is possible to negotiate the agreement the EU would most like to see together with a majority of developing countries and other industrial countries that are part of the Kyoto protocol, for example Japan. It is clear that at this moment the US refuses to accept the binding principles that are at the core of the Kyoto protocol. This is deeply irresponsible, but should not prevent the rest of the world to move on. USA would have to be brought into a binding agreement later.

It would be a far better leadership for EU and its Presidency leader Fredrik Reinfeldt to make use of the climate summit to its maximum extent and move the negotiations as far as possible, rather than playing down expectations, as he is currently doing.

The climate negotiations are now in a state with way too low ambitions, not least the support to climate action in the developing countries of the worl. According to a new UN report about USD 500 billion will be needed each year in climate support to developing countries. This is a large sum, but cheap in comparison with the costs of climate change if we do not act now.

The mindset that 'the last one out of the fossil era wins' seems to shape many of the negotiators. The approach seems to be that we need to ensure that others do as much as possible so that one's own country does not have to act forcefully and will hardly need to pay.

We want to give our support to the Swedish representatives and negotiators as they travel to Copenhagen to decide about the future of the planet. The earth provides clear images and examples on the way: the dramatic decrease of Arctic ice, the changing whether patterns that hit the poor everywhere in the world, the deserts that spread and the rainforests that are being cut at an alarming pace. Examples are also provided by the statements and actions from leaders in the most vulnerable countries who know that they are fighting for the very existence of their countries and our common future.

We can not negotiate with nature, but must respect its limits. Let us therefore discuss how we shall divide the common responsibility to decrease the global emissions and simultaneously invest all that we can in becoming one of the growing low-fossil economies that creates global, cooperative solutions. Sweden and Prime Minister Reinfeldt has a possibility to play a historic role when the world meets to solve the biggest challenge of our time. Let us together do our utmost to make this possibility a reality in Copenhagen in December.

Svante Axelsson
Secretary-General
Swedish Society for Nature Conservation

Lasse Gustavsson
Secretary-General
World Wildlife Fund (WWF), Sweden

Other Key Issues for climate change reports and studies

Footing the bill for climate change: the duty of the rich and the right of the poor to development. (48 pages; March 2009).

This report provides a pedagogic overview of the issues around climate financing. It presents estimates of the needs for financial support, and outlines both current and proposed new climate finance arrangements. It also discusses climate financing in a development perspective and deals with the issue of additionality.

Author: Göran Eklöf,

Climate finance update: From Copenhagen and beyond. Supplement to the report "Footing the bill" (8 pages, March/April 2010)

This update supplements Footing the bill. It provides new estimates of costs for both mitigation and adaptation, presents developments in the lead-up to COP15, and outlines the outcomes of the Copenhagen meeting. It also discusses challenges related to climate finance on the road ahead.

Världens skogar: mer än bara kolsänkor (26 sidor, December 2009, only Swedish)

This report provides an overview of both boreal and tropical forests in relation to climate change. The tropical part focuses on isses connected to REDD (Reduced emissions from deforestation and forest degradation), while the boral part discusses forestry practices and the role of forsts as carbon sinks – and challenges the forest industry.

Authors: Göran Eklöf and Jonas Rudberg

Retooling the Planet? Climate Chaos in the Geoengineering age. (44 pages, December 2009; updated version May 2010)

A report about geo-engineering – large-scale intentional modification of oceans, atmosphere and land to counter the effects of climate change. The study outlines the politics and interests in play, and the many risks and concerns associated with geoenginnering. It argues for precaution, technology assessment and the need for civil society to monitor both the technologies and those favoring them.

Author: ETC Group

A Green Energy Revolution for Climate and Development (88 pages, April 2010)

A compilation of material from SSNC, the United Nations and other actors speaking in favour of a global Marshall plan for substantial public investments to simultaneously tackle climate change and energy poverty. In particular, the idea of global feed-in tariffs for renewable energy is highlighted. The compilation includes a set of four SSNC fact sheets that can also be downloaded or ordered separately, as well as seminar reports, articles, op-eds, news items and excerpts from studies.

You are welcome to download free pdf-versions of all the studies as well as individual seminar reports at www.naturskyddsforeningen.se/keyissues. The publications can also be ordered as hard copies from the Swedish Society for Nature Conservation: keyissuesorder@naturskyddsforeningen.se

Climate Change

Key Issues

Swedish Society for Nature Conservation

The Swedish Society for Nature Conservation is an environmental organisation with power to bring about change. We spread knowledge, map environmental threats, create solutions, and influence politicians and public authorities, at both national and international levels. Moreover, we are behind one of the world's most challenging ecolabellings,

"Bra Miljöval"(Good Environmental Choice). Climate, the oceans, forests, environmental toxins, and agriculture are our main areas of involvement.

www.naturskyddsforeningen.se

Bra Miljöval