

Copenhagen's accomplishments

With plans to decrease deforestation and reduce carbon emissions worldwide, the Copenhagen climate summit has made some valuable steps forward

By Achim Steiner, under-secretary general, United Nations, and executive director, United Nations Environment Programme

The Copenhagen climate summit was neither the breakthrough so many had hoped for, or the breakdown that seemed possible in the late hours of that final day in December 2009. Despite the pessimism in the press, forward steps were taken. If fully implemented they could go a long way toward keeping a global temperature rise to 2°C or less by 2050.

Much credit must go to rapidly developing countries including Brazil, China, Indonesia and South Africa. They produced plans to tackle their emissions and have had these plans internationally monitored and verified.

For the first time in the history of international cooperation on climate change, there is a voluntary partnership between North and South backed by emission targets and intentions. Indeed, more than 100 countries associated themselves with the Copenhagen Accord.

Developed countries pledged \$30 billion of climate support to developing economies and said those funds would lead to perhaps \$100 billion in annual funding by 2020. The \$30 billion, over three years, will assist developing economies adapt to climate change. It will also catalyse a transition to a low carbon economy based on cleaner energy systems.

Perhaps the brightest outcome of Copenhagen relates to forestry. Up to 20 per cent of global greenhouse gas emissions are linked to deforestation. Paying developing economies to conserve rather than chop down their forests could curb these emissions and generate important benefits to local and national economies. Such benefits include enhanced water supplies, soil stability, employment in natural resources management and reversing the rate of biodiversity loss – an elusive target that was to have been met during this year's United Nations International Year of Biodiversity.

Indonesia could earn up to \$1 billion annually if it halved its rate of deforestation under current, relatively low prices for carbon; it could earn more if greater efforts to curb emissions drive the price of carbon higher.

The United Nations Environment Programme (UNEP), the UN's Food and Agriculture Organization and the UN Development Programme are spearheading the UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation. Recognising the value of natural systems in combating climate change is an extremely promising path, because of the mitigation as well as adaptation services provided by such systems.

One area is sustainable agriculture, including organic agriculture. Organic agriculture triggers sharply polarised views: some consider it the luxury of the rich; others suggest it can play a far wider role. Research by UNEP

and the UN Conference on Trade and Development on projects in Africa where small holders had switched to organic or near organic practices found that yields more than doubled after the switch. That increase was 128 per cent in East Africa.

Organic agriculture also locks carbon into soil. In collaboration with the World Agroforestry Centre and a group of scientists, UNEP recently launched the Carbon Benefits Project to assess how much carbon is sequestered in soils and vegetation under different land management regimes. The goal is to establish a standard so an investor in Frankfurt or London or Singapore or New York will know how much to pay a farmer or landowner for the carbon removed from the atmosphere.

While the adaptation potential of mangrove forests as natural coastal defences may be known, the carbon-removing services are not. Experts estimate that carbon

“Recognising the value of natural systems in combating climate change is an extremely promising path”

emissions – equal to half the annual emissions of the global transport sector – are captured and stored by marine ecosystems such as mangroves, salt marshes and seagrasses.

But according to UNEP's *Blue Carbon* report released before Copenhagen, far from maintaining and enhancing these natural carbon sinks, humanity is damaging and degrading them at an accelerating rate. It estimates that up to 7 per cent of these 'blue carbon sinks' are lost annually, or seven times the rate of loss of 50 years ago. There is now a proposal for a Blue Carbon fund like the one for forests that could tip the economic balance in favour of conservation.

Earlier this year UNEP, in collaboration with Indonesia and other UN agencies, launched a science assessment project to bring even greater precision to the carbon sequestration potential of marine ecosystems. Additional scientific support from G8 and G20 countries is welcome.

All eyes are now on the next climate convention meeting in Cancun in November and December 2010. The

A wind power plant in Donggang, Liaoning province. China is keen to reduce its carbon emissions and is spending much of its stimulus package on energy efficiency projects



G8 and the G20 can – along with other forums – play an important part in the chances for success there.

Despite some significant moves forward in terms of emissions, Copenhagen has left a gap between where science says emissions need to be in 2020 – to limit the temperature rise to 2°C or less in 2050 – and where they stand today.

This is the conclusion of a new greenhouse gas modelling study based on the estimates of researchers at nine leading centres, compiled by UNEP and launched in February. The experts suggest that annual global greenhouse gas emissions should not be larger than 48.3 gigatonnes (Gt) of equivalent carbon dioxide in 2020 and should peak sometime between 2015 and 2021.

They also estimate that global emissions need to fall between 2020 and 2050 by between 48 per cent and 72 per cent. Consequently, greenhouse gases must be cut by 3 per cent annually over that 30-year period. Yet the researchers found that even with the best intentions there is a gap of between 0.5 Gt and 8.8 Gt of carbon dioxide equivalent per year, amounting to an average shortfall in emission cuts of 4.7 Gt. If the low end of the emission reduction pledges are fulfilled, the gap is even bigger: 2.9 Gt to 11.2 Gt of carbon dioxide equivalent per year, with an average gap of 7.1 Gt.

Many assumptions lie behind these figures, not least about actual growth rates of rapidly developing economies over the next decade and the consequent emissions. Nevertheless, higher ambition, especially among developed economies, is needed – fast. Contributions could also come from including emissions from aviation and shipping in pledges and plans.

The good intentions of countries such as Brazil and Indonesia are also linked to financing. This underlines the urgency of turning the \$30 billion pledged into investments on the ground. That transformation could go a long way toward building the practical and political confidence and cooperation that took a blow at Copenhagen.

Many developing countries will need clear, transparent reassurance that developed economies are providing new money, rather than repackaged pledges or funds diverted from aid or other existing budgets. Investment in renewable energies and forestry can also support the carbon markets in advance of an international agreement on climate change.

Some countries are not prepared to wait for a new international treaty to shift to a low carbon, resource-efficient 21st-century green economy. More than 30 per cent of China's stimulus package is being spent on high-speed rail, renewables and energy efficiency projects. In Korea, 90 per cent of stimulus is similarly earmarked for green investments. About 30 developing countries and economies in transition have requested UNEP's assistance in transforming their economies and development strategies to a green economy. Some countries are moving forward because it makes economic sense as well as social and environmental sense.

Meanwhile, some of the old geopolitical structures are being stood on their head. In April 2010 General Electric of the United States announced that it and the State of California had signed a broad cooperative agreement with China's Ministry of Railways. Chinese labourers played a crucial role in the construction of America's railroads 150 years ago; today China supplies not workers but high-tech know-how.

The challenge for the G8 and the G20 is to be part of that change while recognising that only through a global, fair and equitable agreement can climate change be addressed fairly and equitably in all 193 countries, all at different points in development and some acutely vulnerable to climatic impacts.

The high-speed train is leaving for some, but others – including small islands and countries on continents such as Africa, Asia and Latin America – may be left behind if a multilateral solution under either the UN Framework Convention, its Kyoto Protocol or an inclusive and fully supported Copenhagen Accord cannot be found. ♦

ONTARIO IS A LEADER IN FIGHTING CLIMATE CHANGE

It is eliminating coal-fired electricity generation even as it fosters a culture of energy conservation and embarks on North America's most ambitious program of bringing green, renewable energy to the province's homes and businesses.

The change in circumstances for Canada's most-populous province has been dramatic. Just a few years ago, fingers were crossed every summer that there would be enough electricity on hot, steamy days.

But billions of dollars of new investment have turned this around. The province's energy future looks secure for the next few years, and that time is being used to usher in a dramatic transformation of the electricity sector.

"Ontario has a very good story to tell and I'm not exaggerating when I say the world is watching us very closely," said Colin Andersen, CEO of the Ontario Power Authority.

"Often when I meet others in the electricity sector from other parts of the world, they're astonished at all that we're doing in Ontario. They might be involved in one aspect of renewing their electricity system – building transmission, or developing renewable energy – but not a transformation of the whole system, involving every part, at the same time. Aggressive conservation targets, getting out of coal generation, a landmark renewable energy plan, smart grid and transmission expansion – we're doing it all in a big way."

BY THE END OF 2014, DIRTY COAL-FIRED GENERATION WILL BE ELIMINATED FROM ONTARIO'S SUPPLY MIX AS PART OF A COMPREHENSIVE PLAN TO MODERNIZE AND "GREEN" THE ELECTRICITY SYSTEM. THIS IS THE SINGLE LARGEST CLIMATE CHANGE INITIATIVE IN CANADA.

It is believed that Ontario will be the first jurisdiction in the world to rid itself entirely of coal-fired electricity generation.

This move will be the single biggest contributor to reducing Ontario's greenhouse gas emissions. The net result to the atmosphere: a potential reduction of up to 30 megatonnes of GHG emissions annually.

The transition to greener power is well under way. In 2009, output from Ontario coal-fired generation plants was the lowest in 45 years, and we're on our way to reducing the carbon footprint of the electricity sector by 75 percent.

Al Gore has called Ontario's plan "the single best green energy program on the North American continent."

The Power Authority, which was established five years ago to provide a long-term plan for the electricity sector, has ensured there is a reliable supply of electricity despite the phase-out of more than 6,000 megawatts of coal-fired electricity by the end of 2014.

It has reinforced Ontario's diversified supply of power – including natural gas, hydro-electric, nuclear and renewable energy – by contracting for about 13,000 megawatts of new and replacement supply. This represents an investment of about \$15.3 billion. By 2012, contracts under the Power Authority's management are expected to double in megawatts, representing an additional \$30 billion, or tripling, in investment in the sector.

That's a lot of change for a 35,000-megawatt system that is becoming increasingly clean.

Ontario has been aggressive in pursuing new sources of renewable supply. In 2009, more than 80 percent of Ontario's electricity came from non-emitting sources of power such as nuclear, water, wind, solar and biomass.



Since 2003, Ontario has increased its online wind capacity 80-fold, going from 15 megawatts of wind power to more than 1,200 megawatts to become Canada's wind power leader. Last year, wind generation rose by more than 60 percent over the previous year. Canada's three largest solar farms launched in Ontario in 2009. And Ontario's largest photo-voltaic solar farm is currently under construction in the province's southwestern region.

At the same time, the Power Authority has also launched a number of programs for businesses and individuals to find cost savings through conservation efforts. More programs are being launched all the time. The first goal, to reduce peak demand by 1,350 megawatts, was realized by the end of 2007. Our long-term objective is to reduce Ontario's peak-use demand by 6,300 megawatts by 2025. That's the equivalent of removing one in five households from the grid. It is Canada's most ambitious demand-reduction plan and it is anticipated that the goal will be achieved ahead of schedule.

The Green Energy Act was passed into law by the Ontario legislature last year. One of the cornerstones of this act is the establishment of North America's most comprehensive feed-in tariff program.

This program offers guaranteed, long-term prices for renewable energy producers with reasonable rates of return to increase investor confidence and make it easier to finance projects. These provisions cover a broad spectrum of project sizes and renewable energies – from homeowners who want to put solar panels on their roofs as well as commercial operators establishing large wind farms. Biomass, biogas, hydro and landfill gas are also included in the program.

So far, the FIT program has been a resounding success. In its first six months, there were more than 9,800 applications, representing about 9,700 megawatts of potential new renewable capacity, and the OPA began announcing this spring the first 2,500 megawatts of contracts.

The applications keep rolling in. That's one reason why the government is planning for a \$2.3 billion expansion of the province's transmission system so it can capture as much of the wind, solar and biomass energy that Ontarians can offer.

The FIT program and other measures in the Green Energy Act are expected to support the creation of 50,000 direct and indirect jobs in the first three years of implementation.

ONTARIO IS PROVING THAT IT'S POSSIBLE TO BE A LEADER IN FIGHTING CLIMATE CHANGE WHILE ENSURING THE FUTURE IS SUSTAINABLE AND PROSPEROUS.

FOR MORE INFORMATION ON ONTARIO'S EFFORT TO COMBAT CLIMATE CHANGE, PLEASE VISIT:

Ontario Power Authority
www.powerauthority.on.ca

Ontario Ministry of Energy and Infrastructure
www.mei.gov.on.ca/english/energy/gea

Ontario Ministry of the Environment climate change information
www.ontario.ca/climatechange



2009

ONTARIO'S GREEN ENERGY ACT ENABLES NORTH AMERICA'S FIRST FEED-IN TARIFF

2010

SOME OF NORTH AMERICA'S LARGEST SOLAR FARMS OPERATING IN ONTARIO

2012

POTENTIAL FOR NEARLY 1,000 WIND TURBINES FROM CURRENT CONTRACTS

2014

UP TO 30 MEGATONNES OF GHG EMISSIONS REDUCED BY ELIMINATING COAL

2025

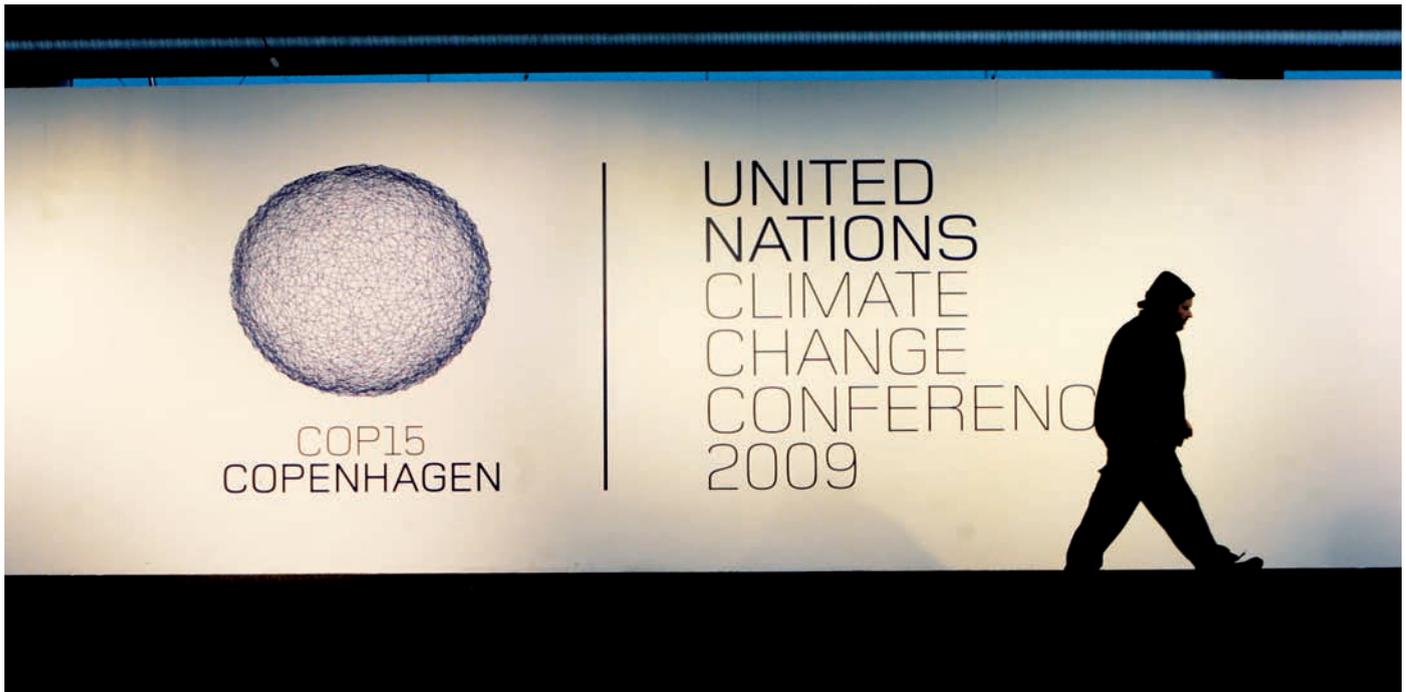
AT LEAST 6,300 MW CONSERVED IN ONTARIO



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The challenge of catalytic leadership for long-term change

The response to climate change demands effective and creative leadership to implement a comprehensive global climate treaty

By Steven Bernstein and Matthew Hoffmann, co-directors, Global Environmental Governance Program, Centre for International Studies, Munk School of Global Affairs, University of Toronto

Governments can react quickly in the face of acute crises. The abrupt shutdown of airspace over much of Europe after the eruption of the Eyjafjallajökull volcano is but the latest example. In that case, the precautionary principle was the default rule: better to err on the side of caution than risk planes falling out of the sky. The financial and climate crises show just how difficult it is to apply the same rule when events unfold in slow motion, or, as in the case of climate change, when the problem has no 'solution', but rather is better understood as an enduring feature of modern life. Under such conditions, the apparent urgency for grand multilateral political action in Copenhagen, in hindsight, may have undermined an opportunity to take advantage of currents in climate policy development that recognise the difficult road ahead to generate an adequate global response.

To be fair, the artificial deadline of 2010 in the Bali Action Plan from 2007 could not have anticipated the

intervention of a global financial crisis. Less charitably, neither did it sufficiently acknowledge the enormous complexity of global climate policy – much of it in parallel to or outside the United Nations framework – especially as it evolves toward a post-Kyoto era. In a post-Copenhagen environment, the challenge is catalytic leadership that will reinforce linkages and results along the multiple policy trajectories that characterise global climate policy in 2010.

What happened in Copenhagen?

The Copenhagen Accord is a three-page political document that affirms a goal of limiting warming to 2°C above pre-industrial levels. It establishes a bottom-up process for industrialised countries to set their own, non-binding, emissions reduction targets and developing countries to list proposed emissions reduction activities, which could also include emission reduction targets. And it calls for the mobilisation of \$100 billion per year by 2020 to support adaptation and mitigation measures in developing countries.

In its favour, the accord appears to overcome the North-South stalemate that blocked US ratification of the Kyoto Protocol, because it opens the door to commitments from all major economies. The institutionalisation of concrete benchmarks for stabilisation and finance is also a major step forward. But the apparent breakthroughs came at a significant political cost. The consequence of bypassing the relatively transparent and inclusive two-track negotiating processes of the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol was that the conference of the parties only 'took note' of the accord. In April in Bonn, parties opposed tentative support not only because many found the Copenhagen process illegitimate, but also because they worried that the accord's lack of binding commitments for developed countries and retreat from 'common but differentiated responsibilities' reflected a step backward from the Kyoto Protocol. As a result, a new track of negotiations is now superimposed on the UNFCCC and Kyoto tracks, complicating an already fraught and complex negotiating agenda, with decreasing expectations for an agreement in December in Mexico. Three important lessons can be drawn for moving forward.

1. Don't underestimate the importance of legitimacy in multilateral climate negotiation.

Attempts to accelerate climate negotiations, or bypass them altogether, through forums ranging from the Major Economies Forum to G8/G20 summits have consistently concluded with the message that ultimately agreement requires the legitimacy of the wider UN processes. That does not mean negotiations should only be undertaken through the UN process, but that the G8/G20 meetings and other key forums are best viewed as opportunities to forge leadership coalitions, break political bottlenecks and catalyse domestic action, not as replacements for detailed negotiations or legitimisation. Here's where, for example, the United States and China can sort out differences over monitoring and peer pressure can inspire new bargains. But reproducing the same groupings in formal negotiations is unlikely to forge a broader consensus required for global agreement.

2. Don't let the politics of multilateral climate negotiations undermine progress elsewhere.

This lesson may seem to contradict the first, but it does not. Even when UN negotiations have floundered, the parallel growth of carbon markets and other experiments in climate policy development demonstrate enormous potential to capitalise on and scale up policy innovation. Bringing the coherence and resources that only states can mobilise to these multiple trajectories should be a priority.

There are several components, beginning with carbon markets. In terms of allowance, several cap-and-trade systems at the sub-national level (e.g., Regional Greenhouse Gas Initiative), national level (e.g., New Zealand) and international level (e.g., European Union) are already operating and more are being designed. While cap-and-trade has recently come under siege in the US and Australia, it is still a preferred tool for addressing climate change across levels of political organisation.

With regard to carbon markets and credit, in addition to the Clean Development Mechanism, voluntary offset markets are growing. A number of crucial standard-setting enterprises have sought to bring integrity to the offset markets. With costs of climate action being a key concern, demand for offsets will continue to grow.

Another component is municipal networks, as perhaps the most momentum for climate action comes from cities. Organisations such as the C40 group of large cities, Cities for Climate Protection, Eurocities and The Climate Group's Cities, States and Regions programmes are coordinating thousands of cities as they look to garner economic

development benefits from climate action.

Public-private partnerships, including government, non-governmental organisations (NGOs) and corporations, are increasingly visible, especially with regard to technology development and deployment. Cisco's Connected Urban Development programme and The Climate Group's SMART 2020 initiative are seeking to transform markets with large-scale pilot projects.

Yet another component is adaptation, which has moved up the political agenda as the world appears resigned to some climatic change. Addressing the effects of climate change, whether by the insurance industry, investment community, development initiatives, municipal networks or UN negotiations, will be increasingly important to the global response to climate change.

Finally, the Asia-Pacific Partnership for Clean Development and Climate Change, the Major Economies Process for Energy Security and Climate Change and the G20, as relatively new multilateral initiatives, have the potential for catalytic, voluntary action and for generating peer pressure. They can foster partnerships, technological innovation and be a basis on which to build sectoral agreements or specific policy initiatives. For example, they could be forums to end, or at least to make transparent, fossil fuel subsidies, which, according to a recent report by the International Institute for Sustainable Development, equal \$500 billion per year.

3. Success on both fronts is inexorably linked.

This last lesson is perhaps the most important. Multilateral success and scaled-up policy innovation are inextricable. To take one key case, while emissions trading is poised to become the central piece of the global response to climate change, cap-and-trade initiatives need a policy commitment to create demand for carbon as a commodity and they must have enforcement.

With uncertainty over the global regulatory environment and targets, maintaining a market and price for carbon becomes extremely difficult. Such uncertainty has contributed to an estimated halving of the expected 1.952 billion tonnes of carbon offsets available under the Clean Development Mechanism from projections just three years ago. Similarly, national and regional carbon market initiatives are facing uncertain futures, with climate change legislation in the US stalled, put on hold in Australia and dealing with threatened pull-outs in the Western Climate Initiative in the US and Canada. In the absence of multilateral progress, further development of carbon markets will remain a significant challenge.

Enforcement ensures the integrity of carbon markets. It requires effective monitoring and compatibility of internal and regional regulation and markets. The integration of private, regional and national markets under a multilateral framework would go a long way to encourage the enforcement, transparency and accountability required for effective markets. It could also address the serious problem of carbon leakage and avoid the need for punitive trade action.

Leadership in Copenhagen's aftermath

The new context of climate action demands a reconsideration of climate leadership. A comprehensive global climate treaty that drives the global response to climate change, setting the boundaries for and motivating domestic action must no longer be the single benchmark for an effective response. Leadership means seeking new roles for multilateral treaties that foster synergistic links among diverse trajectories. This is no mean feat. But recognising the multiple trajectories of climate action and the opportunities that they present for effective and creative leadership is a crucial step toward building the effective global response to climate change that is urgently needed. ♦



Carbon markets demonstrate enormous potential to capitalise on and scale up policy innovation



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What is Saskatchewan? Home to the most advanced climate change research and development on the planet.



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CONSUS

Governing global climate change: from Copenhagen to Cancun

Although some deemed the conference of the parties a failure, the Copenhagen Accord left a legacy of fast-start actions that must be met on the road to Cancun

By Isabel Studer,
Centre for Dialogue
and Analysis on
North America

Based on the lessons learned from the last conference of the parties (COP) in Copenhagen in December 2009, the global climate change negotiations leading to the COP-16 in Cancun this coming December face three key challenges. The first is to structure a complex negotiation process to move the 193 asymmetrical parties of the United Nations Framework Convention on Climate Change (UNFCCC) in a direction that restores trust and builds on the frail political consensus constructed at Copenhagen. The second challenge is to strike a balance between the technical discussions under the UN framework on the one hand and, on the other, the political and diplomatic efforts at informal meetings and forums outside of the process that are deemed necessary to engage the political leadership and build a global consensus without jeopardising the trust that most parties attach to the negotiations under the UN framework. And the third challenge is to nurture reasonable expectations of Cancun, to produce an outcome that is perceived as positive, even if a final binding agreement is not at hand.

Copenhagen

By fixing 2009 as the due date for crafting an international instrument to succeed the Kyoto Protocol, the Bali Action Plan engendered disproportionate expectations for Copenhagen. Those towering expectations were exposed by the unprecedented attendance of 119 heads of state and government and about 45,000 participants, making the Copenhagen climate conference the largest conference in the history of the United Nations. This outlook contrasted sharply with the stark failure of the UN negotiation processes to deliver substantive progress as defined in the Bali roadmap. While the stalemate amply justified the opening of a parallel, informal negotiation track under the Friends of the Chair umbrella, the chair's procedural mistakes in the last-minute high-level diplomatic manoeuvring undermined trust, particularly among developing countries' representatives who repudiated the political accord that was frantically put together on the last day of the meeting by a small group of leaders. Many developing countries rallied around the cry for transparency and demanded an immediate return to the UN processes that had framed the negotiations through the Bali Action Plan since 2007. They were quick to declare Copenhagen a dire failure.

The predominant view that Copenhagen was a total failure must be revisited, however, particularly in light of the 123 countries that, by the end of April 2010, had officially expressed their support for the Copenhagen Accord through written submissions. In fact, 78 countries, accounting for more than 80 per cent of global emissions, have declared commitments to limit such emissions. The Copenhagen Accord may lack legal standing under the UNFCCC, but it nonetheless contains a basic agreement among major emitters on the main elements of any future climate agreement. By providing overarching political guidance on the emission targets of developed countries, finance, technology and capacity building, the accord broke the fundamental deadlock that had for so long prevented the technical negotiations of the two tracks defined by the Bali roadmap from moving forward.

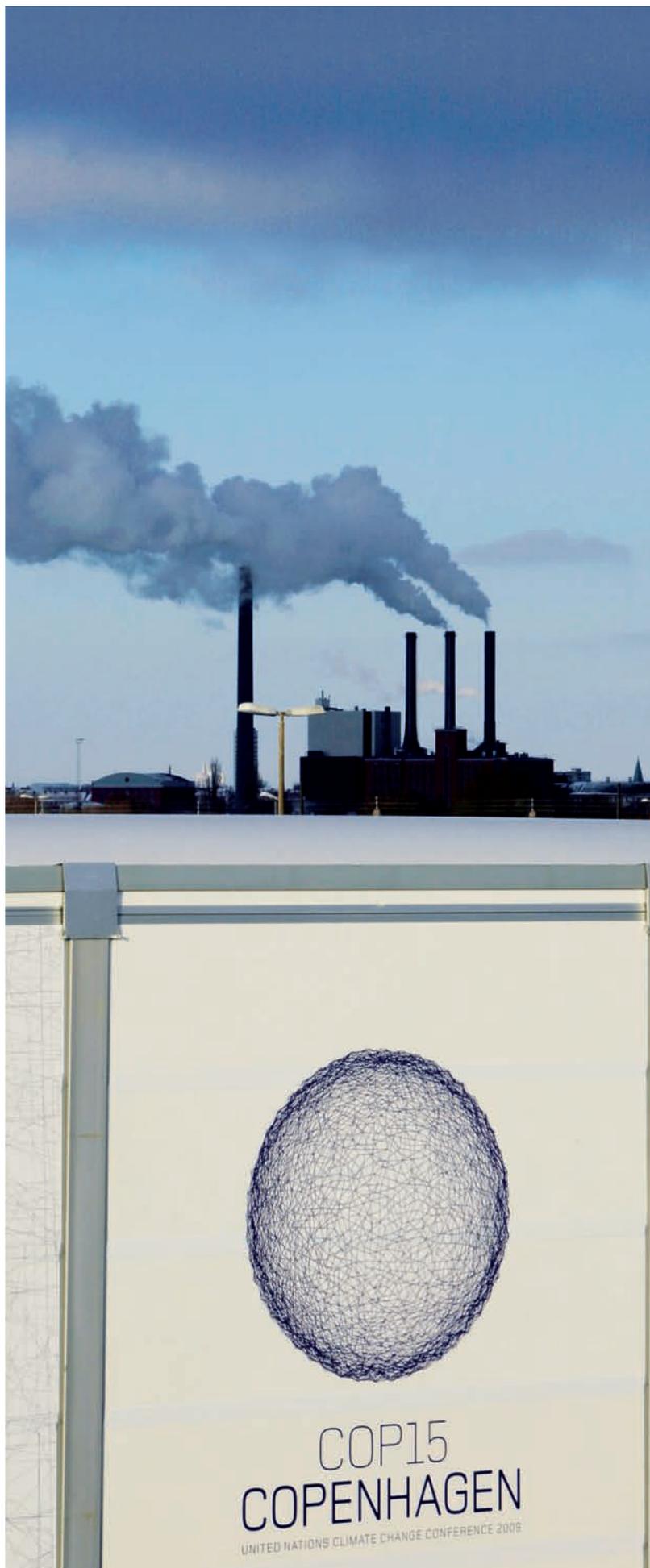
The road to Cancun

Together with the draft text under the UNFCCC, particularly regarding the principles and priority actions for each key area, the Copenhagen Accord already serves as a guide for the implementation of fast-start actions in developing countries on mitigation, adaptation and technology development and transfer, even before a comprehensive agreement is reached. Enabling such actions is the pledge by developed countries to provide up to \$30 billion for mitigation and adaptation between 2010 and 2012, to prioritise funding for adaptation for the most vulnerable developing countries and to mobilise financial resources through the immediate establishment of REDD-Plus, an enhancement of the UN's programme for Reducing Emissions from Deforestation and Forest Degradation aimed at promoting forest conservation. There is a political agreement to make national appropriate mitigation actions (NAMAs) for developing countries subject to domestic procedures that are measurable and verifiable and that must be reported every two years through national communications; that same agreement removed the hesitation of many countries to move ahead with their self-financed NAMAs. It is essential that developed countries follow through on their financial commitments to support fast-start action in developing countries quickly and effectively in order to build trust and create positive momentum where negotiators see real progress at hand.



The G20 is well positioned to help distribute the resources committed by developed countries through the Copenhagen Accord





Success at Cancun will also require that the political leadership that materialised in the Copenhagen Accord remains constant and sustained until the next COP in December 2010. Copenhagen came up with broad figures on finance and mitigation targets that broke an important deadlock in the climate negotiations – up to \$100 billion annually from 2020 onward for long-term financing and substantial cuts in greenhouse gas emissions through individually or jointly qualified economy-wide emission targets for 2020 in order to maintain global temperature rise below 2°C from pre-industrial levels. But the details to put these broad commitments into operation still need to be fleshed out and agreed to. It is necessary to

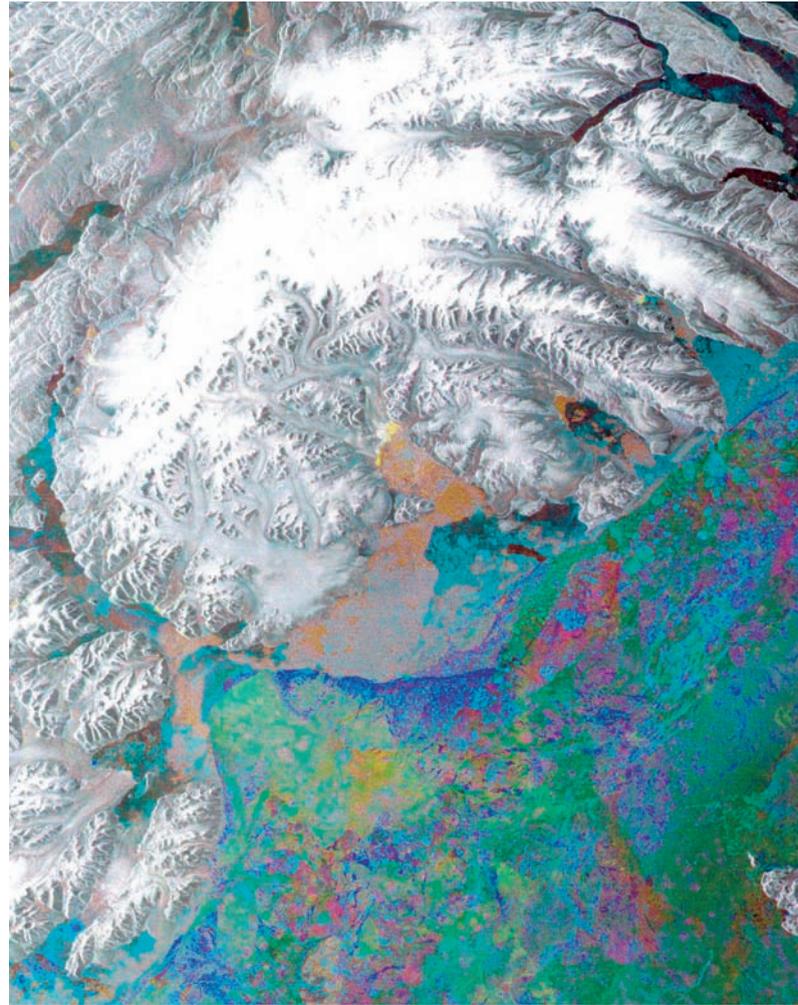
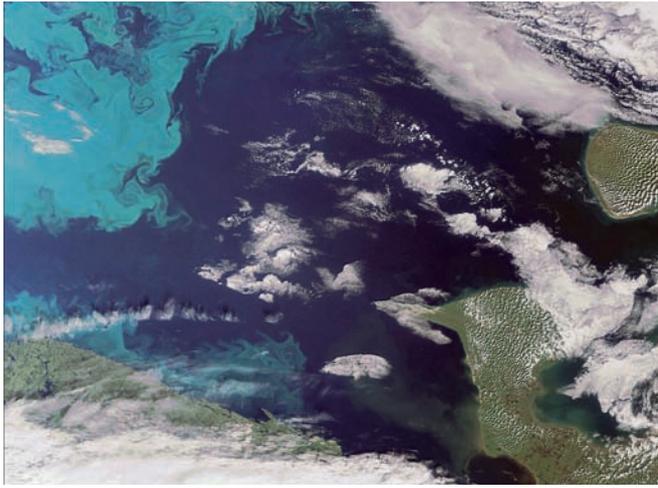
“Copenhagen came up with broad figures on finance that broke an important deadlock in the climate negotiations”

keep political leaders actively engaged in the discussions in order to strengthen Copenhagen's tenuous political consensus. Several ways may allow a move away from the complex, ineffectual, path-dependent processes entrenched in the UNFCCC, such as searching for innovative and flexible ways to frame the discussions, focusing on specific areas of climate change action, breaking down climate change mitigation and adaptation commitments, and deliberating process in alternative forums that involve key actors and countries on each topic. Such steps could enhance participation and restore some of the COP's credibility.

G20

The G20 can take on a critical global governance role in the lead-up to Cancun. Accounting for two-thirds of the world's population, 90 per cent of global economic activities and at least three-quarters of global greenhouse gas emissions, the G20 is well positioned to help construct the financial architecture to distribute the resources committed by developed countries through the Copenhagen Accord. It could also provide a full range of options on innovative sources of finance, including revenue from measures to tackle aviation and shipping emissions, auctioning allowances in cap-and-trade systems, special drawing rights, financial transaction taxes and other financial instruments that could be a significant source of income for climate change action.

Following on the commitments made at the G20 Pittsburgh Summit in September 2009 to intensify efforts to remove fossil fuel subsidies, the G20 countries could further agree to redirect those subsidies, as well as stimulus resources, toward a long-term commitment to invest in clean energy, energy efficiency, adaptation and reduced deforestation. The G20 can also decide to adopt environmental pricing policies, through taxes or cap-and-trade systems that ensure that carbon, pollutants and scarce ecological resources are no longer free. Taking these steps could facilitate commitments regarding emission reduction targets in a post-Kyoto global climate change framework. The G20 summits in Toronto and Seoul on the way to Cancun will be critical to achieving these ends. ♦



Using satellites to tackle the challenges of climate change

The efforts of the European Space Agency

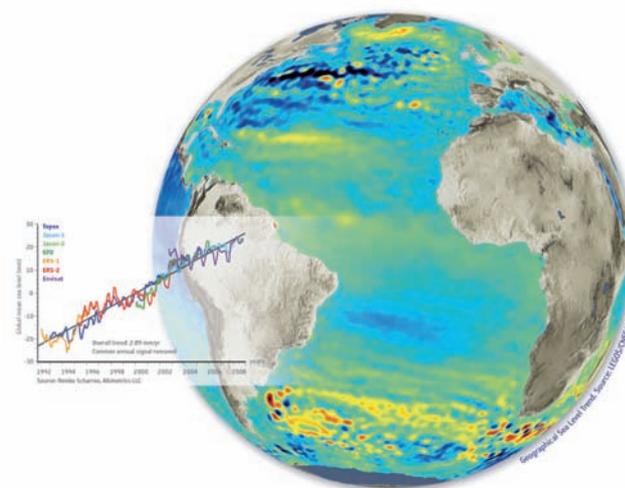
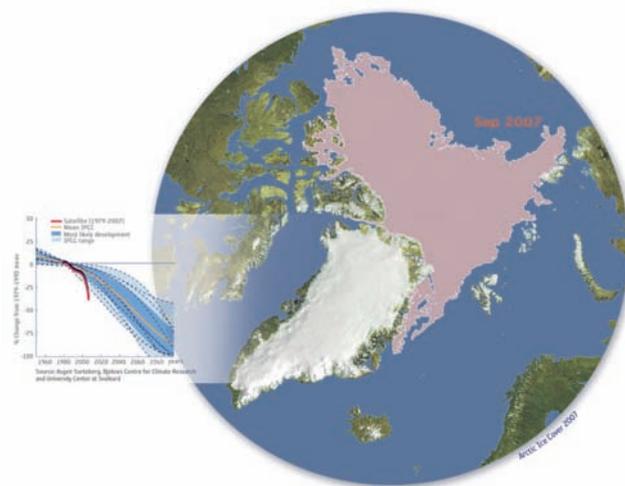
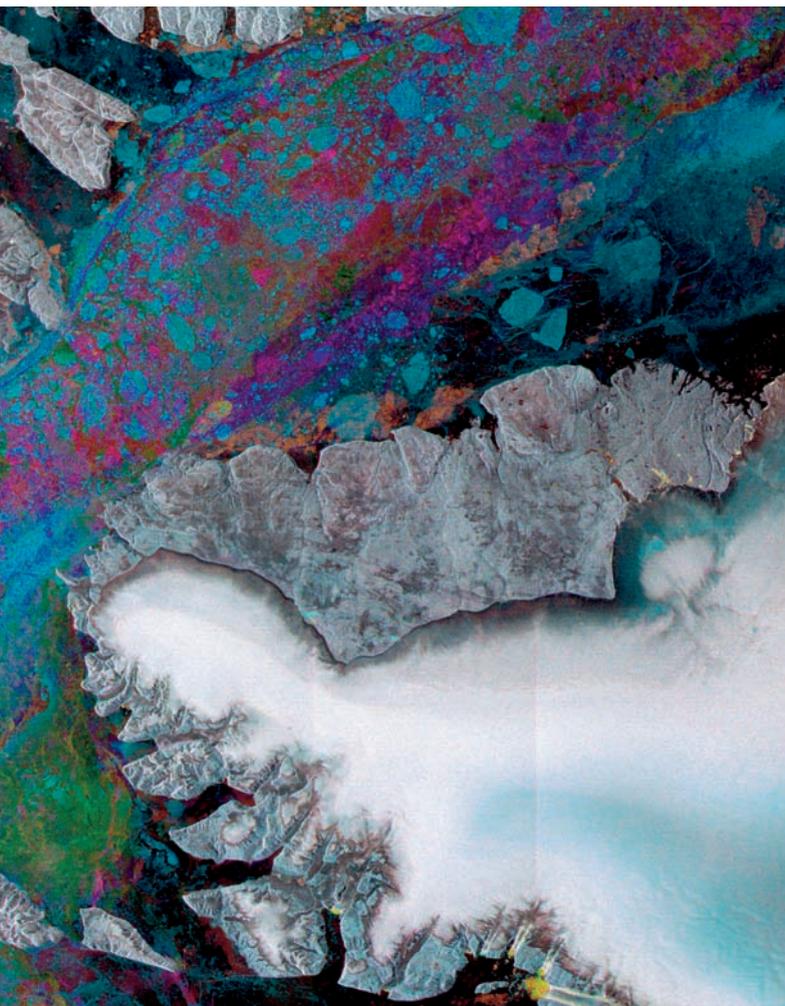
Monitoring and understanding climate change processes is complex, as is its political and scientific setting. The impact of observed or forecasted variations of our environment is far reaching, and false or imperfect observations can cause confusion and misunderstanding. It is imperative therefore to provide a basis of factual evidence, scientific models, social debate and political action for climate related issues. Satellites deliver the data necessary to underpin our knowledge of climate reliably, objectively, repeatably and without prejudice across the entire globe.

A better understanding of the function and interactions of all aspects of the Earth system, as well as the role humans play therein, has always been a central goal of space-based Earth Observation. The European Space Agency has been developing space-based systems for over 30 years in support of operational weather monitoring and forecasting. With the advent of multi-purpose missions (ERS-1 in 1991, ERS-2 in 1995 and Envisat in 2002), climate related data have been increasingly obtained and

analysed for scientific purposes. These missions have also fed an impressive archive of dozens of terabytes of climate-relevant data. Some three thousand scientific projects around the world are using these data for a wide variety of research topics.

The ESA Earth Explorer missions – specialised satellites focusing on themes of scientific urgency – complement this observation portfolio. GOCE, a mission to map the Earth's gravity field with unprecedented accuracy, was launched in March 2009 and SMOS, the ESA Soil Moisture and Ocean Salinity mission, followed in November 2009. Only five months later, the third Earth Explorer – ESA's Ice mission, Cryosat – was delivered into orbit in April 2010. Another four Explorers are under development, each devoted to investigating particular aspects of the Earth system and, together, giving us a complete picture of the Earth and its behaviour. Earth Explorer missions use the most modern technology, often never flown before, to close observation gaps and deliver accurate and reliable data for measuring important parameters of our Earth and climate system.

The importance of global observation for understanding



climate change has also triggered action on the international scene. The “Global Climate Observing System” (GCOS), a body set up by the UNFCCC to provide the necessary observations for understanding the Earth’s climate, defined a set of “Essential Climate Variables” (ECVs) which, systematically monitored, quantify the state of our climate in an objective and effective way. In response to this challenge, the ESA “Climate Change Initiative” aims to “systematically generate, preserve and give access to long-term data sets of the ECVs derived from satellite missions developed and operated by ESA. The systematic generation of relevant ECVs includes recalibration, periodic reprocessing, algorithm development, product generation and validation, and quality assessment of climate records in the context of climate models.

But the Climate Change Initiative even goes beyond that, introducing a “feedback loop” mechanism, whereby new user feedback and the latest scientific knowledge can be easily integrated within each re-processing phase. A scientific advisory board, involving world-leading scientists representing key stakeholder organisations, provides guidance on the conduct of the programme ensuring its effective implementation and integration in the wider context of climate data measurement worldwide.

Recent years have shown more than ever the human dependence on our environment – natural resources, climate, space for living and developing. Climate models predict drastic impacts on the Earth as a consequence of the behaviour of mankind. It is critically important to ensure that these models are robust and based on the best possible data as the political and financial consequences of taking action to mitigate climate change are very significant. Adaptation to change and attribution

of the causes of change also require a reliable and agreed basis for action. Observations from space are critical to a consensus of understanding and response - science has long left the infamous ivory tower and has become a pre-requisite for coherent political action.

Through its Earth observation missions, ESA is developing and operating climate-quality observing systems, providing free access to the worldwide science community, and working with its partners to ensure long-term observations of fundamental climate data records. In order to ensure the continuity of high quality, accessible data for climate and environmental monitoring ESA has developed a suite of missions, known as the Sentinels, in the context of the European Global Monitoring of the Environment and Security initiative (GMES). Five series of Sentinel missions, devoted to monitoring different aspects of the Earth’s oceans, atmosphere, cryosphere and land surface, will provide society with the objective basis to allow informed decisions on the future of mankind in the context of changing climate to be taken. The basis for political action must be a sound understanding of the Earth system, derived from reliable measurements from space.



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The road from Rio

As more and more industries recognise both the financial benefits and the importance of taking the environment into consideration, emissions trading is emerging as a strong, global market

By Richard L. Sandor, chair and founder, Chicago Climate Exchange

When the members of the United Nations gathered 17 years ago in Rio for what was the first Earth Summit, climate change was a concern for a small number of scientists and environmentalists. Even fewer at that time believed that 'trading air' would result in a global market in the coming years.

Today, emissions markets are paving the way for innovative solutions and cost-effective greenhouse gas reductions. The pace at which the change has occurred has been remarkable.

Emission trading has become widely adopted as greenhouse gas management has moved from the confines of corporate environmental compliance departments into the heart of corporate financial planning.

Cooling towers emit fumes at a coal-fired power station



This has been in response to both strategic need and public scrutiny. Environmental issues are increasingly understood to be part of necessary risk management as investors and analysts pay closer attention to climate liability and as customer expectations make it a critical part of a good business model.

The road from Rio to today started with the success of an acid rain cap-and-trade programme in the United States. The premise was simple: use market innovations to help achieve environmental and economic goals. The US Environmental Protection Agency (EPA) established a programme under the Clean Air Act that today has resulted in sulphur dioxide emission reductions of 50 per cent below 1990 levels. The EPA estimates that the public health benefits of the programme alone are more than \$120 billion annually, exceeding the programme costs by a margin of more than 40 to one.

As chair of the Chicago Board of Trade's Clean Air Committee at the time, I was involved in the development of the first spot and futures markets for sulphur dioxide emission allowances. This later led to applying the same concept to greenhouse gas emissions. Building a market from scratch that trades something that cannot be held in a hand meant facing a lot of resistance. Initially, the idea was received with scepticism.

But forward-looking businesses recognised the benefits. Today the US has a voluntary pollution reduction and trading programme, the Chicago Climate Exchange, with more than 400 members and an annual baseline of nearly 700 million tons. Local efforts such as the Regional Greenhouse Gas Initiative and renewable energy programmes are gaining traction at the state level. And on the federal front, the House of Representatives passed a bill last year and the Senate continues to push forward on comprehensive climate legislation this summer. While these things do not always move at the most desirable pace, they are at least moving in the right direction.

In Europe, under the European Union Emissions Trading Scheme, carbon markets have matured with strong growth in volumes, liquidity and the critical creation of new products.

And in a very exciting development, China continues steadily to build the architecture to implement environmental markets. In 2008 the Chicago Climate Exchange helped to establish the first emissions exchange in China, the Tianjin Climate Exchange (TCX). Through a joint venture with the City of Tianjin and the China National Petroleum Corporation Asset Management Company, a platform was established to develop electronic emissions trading and auction facilities for financial





“ Pollution reduction markets will continue to emerge in developed and developing countries around the world ”

products to reduce various pollutants and promote energy efficiency. The TCX has begun to implement pilot initiatives that can help pave the way for strong market-based infrastructure that facilitates the environmental and policy goals of the People's Republic of China.

In the coming years pollution reduction markets will continue to emerge in developed and developing countries and financial centres around the world. Global development to date has taken place in a 'bottom up' manner that follows patterns in other internationally traded markets. This is

also consistent with the history of international political cooperation. International agreements tend to grow from small beginnings: the European Coal and Steel Community evolved over many years into what eventually became the European Monetary Union.

Today's markets in the US and Europe will be joined by other blocs of countries to form markets that are linked by similar contracts – much like one might see with crude oil today or like with cotton in the 19th and 20th centuries. Past experience shows that integration of markets can succeed even if the individual markets exhibit fundamentally different characteristics.

Applying market innovation is a critical tool for achieving economic and environmental goals. One of the value propositions of carbon markets is the ability to provide cost-effective emissions management tools for businesses, as well as a disclosure mechanism for the market and a transparent path to price discovery. Carbon markets and the price signals they send help change behaviour, spur innovation and identify internal efficiencies.

As world policymakers discuss the next steps and the important transformative role that markets can play, the efforts by G8 and G20 members will continue to shape and drive the international momentum that is needed to confront climate risks that know no borders. ♦

WE'RE WORKING TOWARDS A SUSTAINABLE FUTURE



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Noble Carbon Credits Limited has established itself as a key player in the emissions trade market and has successfully transferred several million tons of Certified Emission Rights to its European counterparties. Operating from offices in Dublin, Ireland; Frankfurt, Germany; Lausanne, Switzerland; Calgary, Canada; Stamford, USA; Hong Kong and Beijing, China; Mumbai, India; NCCL secures long-term supplies of Carbon Credits from new CDM and JI-Projects. Our flexible and innovative approach creates a "win-win" partnership for our customers.

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Noble Carbon Credits Limited

Thorsten Ansorg
Managing Director

1/F Gilford Hall, 13 Gilford Road
Sandymount, Dublin 4, Ireland
Tel: +353 1 260 7660
Fax: +353 1 260 7661
Mobile: +49 160 7150994
Email: thorstenansorg@noblecarbon.com

Noble Carbon Credits GmbH

Olaf Kallinich
Director Origination

Hamburger Allee 4
D-60486 Frankfurt, Germany
Tel: +49 69 78989 342
Fax: +49 69 78989 370
Mobile: +49 160 7150992
Email: olafkallinich@noblecarbon.com

Noble Carbon Credits

Robert de Boer
Director Sales & Trading

Avenue des Mousquines 4
CH-1005 Lausanne, Switzerland
Tel: +41 21 331 1864
Fax: +41 21 331 0891
Mobile: +41 79 624 3560
Email: robertdeboer@noblecarbon.com

Noble Carbon Credits

Martin W. Gitlin
Managing Director

Four Stamford Plaza, 107 Elm Street
Stamford, CT 06902 USA
Tel: +1 203 363 7516
Fax: +1 203 326 6520
Mobile: +1 203 293 5665
Email: martingitlin@noblecarbon.com

Energy security and climate change – the role of carbon capture and storage

By Terje Riis-Johansen, Minister of Petroleum and Energy, Norway



Energy is a key driver of economic development and poverty reduction. Energy security is a prerequisite for life as we know it. Today, fossil fuels account for 80 percent of our primary energy use, and all projections show that the world's dependence on fossil fuels may not change substantially for decades to come.

At the same time the world faces the threat of climate change. A threat that is incomparable to anything humans have experienced before. If we are to reach the 2 degree target and prevent the dramatic effects of climate change, we must cut global greenhouse gas emissions by as much as 85 percent by 2050.

Energy-related CO₂ emissions account for 84 percent of total global emissions. According to the Intergovernmental Panel on Climate Change CCS has, after energy efficiency, the second largest potential for global emission reductions. Massive investments in renewables and energy efficiency must be made. Yet, an enforced effort to stimulate development, deployment and dissemination of CCS technology at a global scale will in our view be vital to keep the increase in global average temperature within 2 degrees.

In light of the vast potential for CO₂ reductions offered by CCS technology, Norway, like several other countries, sees CCS as an indispensable part of an effective portfolio of greenhouse gas mitigation tools. With national CCS projects, the Norwegian Government is taking concrete action to further develop and advance this technology.

We find ourselves in a phase where initial project funding is crucial. There are five large-scale CCS facilities in the world today, and all over the world projects are being planned. I believe governments have a responsibility to bridge the funding gap during this phase. Without public financing, the number of projects being realised may be marginal.

Therefore, the Norwegian Government is investing heavily in national CCS projects. In 2006, the Government and Statoil agreed on developing CCS technology at Mongstad. The first stage is a CO₂ Capture Technology Centre (TCM). Construction started in June 2009, and it is scheduled to be operational in late 2011. The purpose of the technology centre is to develop, test

and qualify CCS technologies, and thereby reduce the costs and risks related to full-scale CO₂ capture. It is our ambition that the TCM shall generate knowledge that exceeds well beyond Norwegian borders. The second stage is a full scale CCS plant capturing up to 1.2 million tonnes of CO₂ annually. The government will finance the costs of investment and operation of the CCS facilities, while Statoil covers costs equal to their alternative CO₂ costs. Captured CO₂ will be transported by pipeline for storage under the seabed in the North Sea.

Norway has unique experience in the field of environmentally sound geological storage of CO₂. Since 1996, 1 million tonnes of CO₂ has been injected and stored annually at the Sleipner field in the North Sea. The project is unique in that it is so far the only facility in the world where large quantities of CO₂ are stored in a geological formation below the seabed and for emission mitigation purposes. Multinational and multidisciplinary research projects have monitored the stored CO₂. The data shows no unexpected movement in the storage reservoir and no sign of leakage of the stored CO₂.

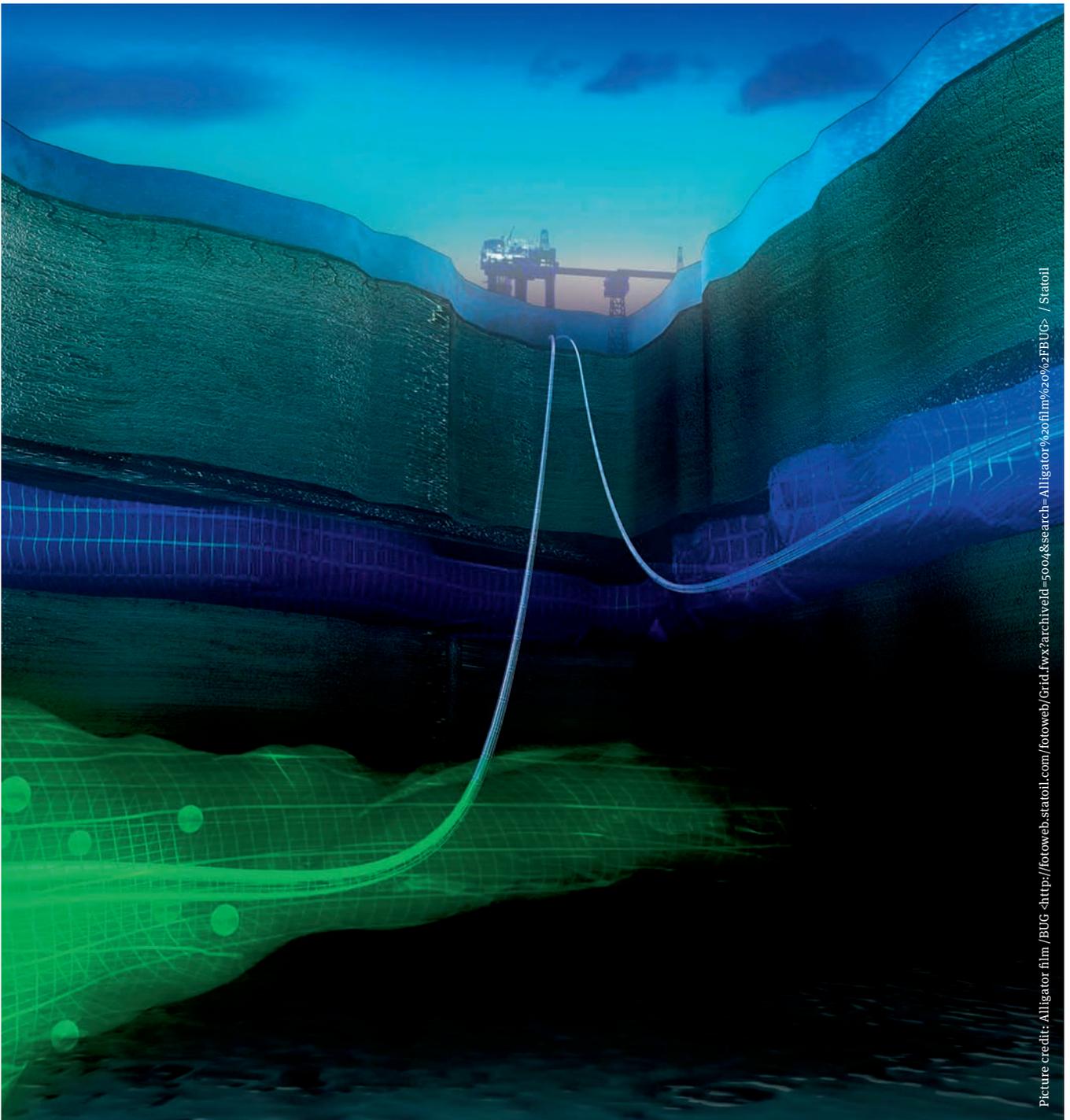
We can better address challenges arising in the initial deployment phase if we share knowledge and experiences. This is crucial for the acceleration of CCS deployment. Moreover, the sharing of experiences from early projects will also play an important role in building confidence in the technology. Here, stakeholders in industry and civil society have a particular role to play. We have a collective responsibility in communicating to the public the potential for emission reductions offered by CCS.

For moving to a commercial phase, we need to create business opportunities and a commercially attractive framework for private investment. This is why the Norwegian government in 1991 introduced a CO₂ tax for offshore petroleum installations. The tax resulted in the CO₂ injection project at the Sleipner field in the North Sea.

Yet, financial incentives must be established at a global scale, in order for CCS to be deployed rapidly enough to meet the enormous challenge of climate change. Norway believes that global action under the United Nations Framework Convention on Climate Change and its Kyoto Protocol is necessary to move the global implementation of CCS forward. CCS must be included in an appropriate financial mechanism that covers actions in developing countries, and by that stimulate CCS-related investments in these countries. This is important in order to promote sustainable economic development as well as enhance energy security.

The inclusion of CCS in an appropriate international mechanism will also contribute to speeding up the transfer of technology and expertise to developing countries. Capacity building activities are imperative in making both countries and industry capable of employing CCS technologies.

Making CCS commercially attractive also requires the establishment of predictable legal and regulatory frameworks



Picture credit: Alligator film /BUG <http://fotoweb.statoil.com/fotoweb/Grid.fwx?archiveld=5004&search=Alligator%20film%20%2FBUG> / StatOil

for environmentally sound transport and storage. It is the governments' responsibility to establish such frameworks, and we are making significant progress in this area.

Addressing the challenges we meet on the way to global CCS deployment, requires increased international cooperation. New initiatives have been made in the last few years, and there is an increased political attention ascribed to the acceleration of CCS. Institutions such as the Carbon Sequestration Leadership Forum and the Global CCS Institute enable us to increase our collaboration further. From my point of view, it seems crucial that the G8 and G20 put CCS high on the agenda and set goals for the acceleration of this climate change mitigation measure.

CCS is part of the answer to how we meet energy demands and the call for CO₂ reductions at the same time. Investments in renewables and energy efficiency are imperative. Yet, when

current analysis predict that fossil fuels will continue to dominate our energy-mix in 2030 and beyond, we must reduce emissions from the production and use of fossil fuels. CCS is the only option in this respect.



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A scientist stands beside a carbon capture test unit at Longanet power station, Scotland. The new technology being tested at the coal-fired power station removes carbon dioxide using chemicals and turns it into a liquid which is stored underground



Pushing ahead with carbon capture and storage

Carbon capture and storage offers the global community time to develop renewable energy alternatives. However, inconsistent regulation, lack of funding, logistical setbacks and an ill-informed public remain challenges to overcome

By Keith Forward,
editor, Carbon
Capture Journal

Carbon capture and storage (CCS) is the only current technology that can give the global community breathing space to develop renewable energy alternatives while fulfilling the necessary carbon dioxide reduction targets.

CCS is an essential technology to help the world mitigate climate change. It accounts for 19 per cent of the reductions needed to meet the Blue Map scenario produced by the International Energy Agency (IEA), which assessed strategies for reducing greenhouse gas emissions by 50 per cent by 2050.

It is a technology for realists – coal use in power generation is set to rise and CCS is the only technically sound and cost-effective technology currently available that can mitigate carbon dioxide emissions from this dirtiest of fossil fuels.

CCS is also a viable solution for a wide range of industrial processes, such as the production of cement, steel and chemicals. The IEA estimates that without including CCS in the technological mix the global cost of meeting the 2050 climate change target would increase by 70 per cent.

Industry is ready to move ahead with implementing CCS on a significant scale; it is political will that has impeded progress.

At the 2008 G8 Hokkaido-Toyako Summit in Japan, the G8 committed to launching 20 large-scale CCS demonstration projects globally by 2010. The IEA's CCS Roadmap calls for 100 commercial projects by 2020, requiring an additional \$54 billion investment.

These are no doubt ambitious targets, requiring "comprehensive, coordinated and disciplined leadership involving governments, industry and the community at national and international levels," according to a 2009 report by the Global Carbon Capture and Storage Institute.

And this is where the G20 can take a leading role, not only by strengthening political will, but also by innovating sources of finance for private sector investment and ensuring a predictable future market in which to recoup those investments.

Challenges

There are some remaining technological challenges to be overcome, particularly the quantification and qualification of storage sites and the efficient integration of the full CCS chain – capture, transport and storage.

Legal and regulatory hurdles are also significant and have caused delays in implementing pilot and demonstration projects. Private sector investment is

“Information needs to be available to the public in order to increase acceptance that CCS is the right approach to tackling climate change”

hampered by an uncertain regulatory environment. The G20 should seek to ensure a consistent implementation of laws across national boundaries.

It is important not to forget the importance and challenge of public communication of CCS. Widespread public support, understanding and acceptance are essential and will put pressure on governments to act. Individual projects that have failed to engage with the legitimate concerns of the local community have often faced significant delays or cancellation due to public opposition.

As consumers will most likely be expected to pay more for electricity as a result of CCS, there needs to be more information available to the public in order to increase acceptance that this is the right approach to tackling climate change.

Industry is not trusted to put across an unbiased representation of the facts. International governments have so far been woefully inadequate at getting across a consistent message to the public, while non-governmental organisations such as Greenpeace have focused on opposing new coal-fired power stations in any form.

Time to act

Environmental pressure groups advocate a comprehensive move to renewable sources of energy. Of course, eventually, as fossil fuels are exhausted, this is the inevitable outcome whatever steps are taken to reduce carbon dioxide emissions in the short term. CCS has only ever been seen as an interim solution.

But crucially it gives the world time to develop alternatives while dealing with the immediate situation of rising energy demand, particularly in developing

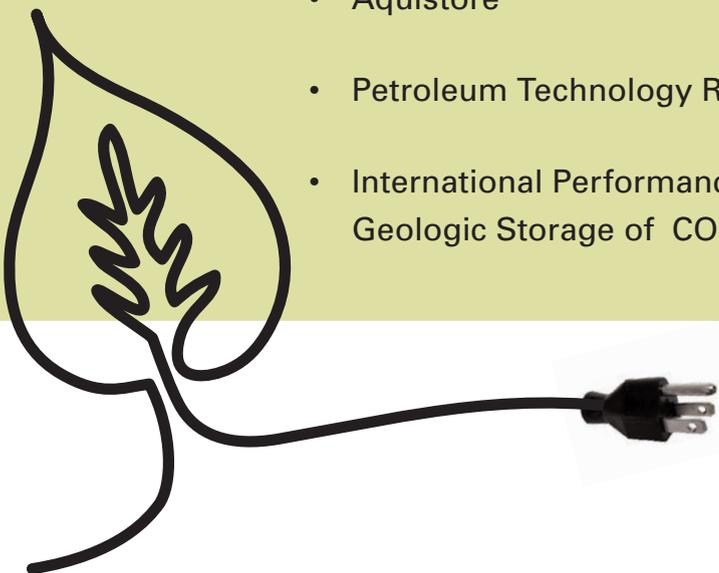
Our clean energy plan.

Saskatchewan has long been dedicated to advancing the development of clean energy and is now recognized as a leader in carbon capture and storage (CCS) research and development. This exciting new option will change the way the world produces and uses energy and help fight climate change by reducing greenhouse gas (GHG) emissions.

CCS technology allows coal-fired power stations and other large industrial emitters to virtually eliminate GHG emissions by capturing and storing carbon dioxide (CO₂) underground. The CO₂ can also be sold for enhanced oil recovery.

Saskatchewan has developed a substantial lead in CCS experience and signalled its commitment to finding a responsible use for carbon by investing and participating in numerous CCS projects:

- Boundary Dam Integrated Carbon Capture and Sequestration Demonstration Project
- International Test Centre for CO₂ Capture (ITC)
- Weyburn-Midale CO₂ Project
- Aquistore
- Petroleum Technology Research Centre (PTRC)
- International Performance Assessment Centre for Geologic Storage of CO₂ (IPAC - CO₂)



Powering the future

Today, SaskPower – Saskatchewan's provincial electrical utility – is leading the development of one of the largest integrated CCS projects in the world.

The **Boundary Dam Integrated Carbon Capture and Sequestration Demonstration Project** would rebuild and then repower an aging coal-fired power generation unit at the Boundary Dam Power Station near Estevan, Saskatchewan, Canada.

By 2013, the new unit would produce 115 megawatts of clean, baseload power while reducing Saskatchewan's annual GHG emissions by about 1 million tonnes.

Innovation

Building on the innovative sulphur dioxide and carbon capture technology developed by Cansolv and the project management expertise of SNC Lavalin, SaskPower is completing the work to define this leading edge project at Boundary Dam. With final approval anticipated in 2010, a reliable, affordable and clean supply of electricity could soon be available for many years to come.

SaskPower, the Government of Saskatchewan, the Government of Canada and private industry partners are working together on this project to help move our world closer to a more environmentally and economically sustainable future.



clean **co₂**™

 **SaskPower**
Powering the future



countries, and the resultant increase in emissions from fossil fuel use.

At a time of deep economic recession, there is even more need to emphasise that climate change will not wait for the world to sort out the global banking system. Delays just mean potentially greater financial burdens for future generations.

Paradoxically, there is a unique opportunity here, as leaders look for ways to stimulate the economy and invest in growth and new jobs. This is exactly the time to invest in a green industrial economic recovery – and the G20 should take a leading role.

Sources of finance are desperately needed, particularly during the early phases of CCS deployment. Building first-of-a-kind technology is inevitably too expensive to be viable on a purely commercial level.

Costs will come down with more research and the experience gained from demonstration projects. But in the near run only public finance will make up for the shortfall.

While government investment has been remarkable given that CCS was only a pipe dream a few years ago, it

is not enough. The IEA's CCS roadmap estimates that the members of the Organisation for Economic Co-operation and Development will need to increase funding for CCS demonstration projects to an average annual level of between \$3.5 billion and \$4 billion from 2010 to 2020.

“ This is exactly the time to invest in a green industrial economic recovery – and the G20 should take a leading role ”

Carbon capture and storage technology: boiler assembly for pilot plant at Schwarze Pumpe, Germany



The World Bank and the European and Asian development banks can play a large role by increasing the amount of funding available for green technology. The G20 should look at establishing a green investment bank specifically to coordinate the distribution of funds for carbon reduction projects.

It is also important to promote market-based schemes that assign a value to carbon and to ensure that the proceeds of emissions trading from such schemes go back into green projects.

G8 countries can lead by example. A report by the Atlantic Task Force Global Green Recovery recommends that the proportion of auctioning revenues from emission trading that must be reinvested in green projects should be increased to 50 per cent by 2015 and 100 per cent by 2020 in Germany, the United Kingdom and the United States.

Knowledge transfer

Much more needs to be done to promote transfer of CCS technology to developing countries. A significant

number of new coal-fired power stations are being built in the developing world. There is a risk that older, dirtier technology without the potential for CCS will lock in emissions for many years to come.

Progress could be made through the immediate inclusion of CCS in the Clean Development Mechanism, which allows countries with an emissions reduction commitment to receive credits for investing in a project in a developing country. Unfortunately this was rejected at the Copenhagen climate change meeting in December 2009. It will probably not be revisited until 2011.

The G20 can foster international cooperation and technology transfer by developing more collaborative projects such as the Near-Zero Emissions Coal project, a joint initiative of the United Kingdom, the European Union and China. It can also help by providing a forum for the exchange of information, both on technical progress and sources of international finance.

Ultimately, it will be the successful deployment of CCS in countries such as China and India that will make the biggest contribution to mitigating climate change. ♦



SIDS climate change dilemma: keeping average temperature increase below 1.5°C to stay alive

As changing climate and rising sea levels negatively affect Small Island Developing States (SIDS), an uncertain future lies ahead for the millions of people who inhabit these island nations. In the absence of urgent concerted action, what is certain is the continuing destruction of SIDS' livelihoods, coasts and countries, and the probability that large human populations will be displaced. Much of this is already occurring as a silent escalation on our shores and on our lands.

What could interrupt the trajectory of this looming global climate catastrophe for twenty percent of the world's population, emitting less than one percent of greenhouse gases (GHG)? The Alliance of Small Island States (AOSIS) argues that urgent,

collective, scaled-up and ambitious action can make the difference. Many others must join SIDS who are engaged in actions ranging from improving disaster management, movement to low carbon economies and enormous efforts in the climate change negotiations. We cannot do this alone.

G8 and G20 exert strong influence on the global policy landscape. Within the context of UNFCCC climate negotiations, SIDS can benefit from this influence in three basic areas if G8 and G20 would:

- Recognize the stark vulnerability of SIDS and deliberately take this on board as a central part of all proposals and responses in climate negotiations. This means taking



ambitious positions. Mainly industrialized economies have already increased the average temperature by 0.8°C above pre-industrial levels, and with current atmospheric concentrations of GHG in excess of 387 parts per million. The world has to de-escalate from this. AOSIS calls for average global temperature increases to be no more than 1.5°C. This is commensurate with a limit of 350 parts per million of carbon in the atmosphere, and an aggregate reductions of 45% over 1990 levels by 2020 and 95% by 2050. Is this affordable? Yes. And the cost of continuing at higher levels only increases over time.

- Provide adequate support that will strengthen the ability of countries and communities to adapt to impacts already being felt. This must include support for a comprehensive loss and damage insurance and a risk management facility to ensure that socio-economic gains are not lost to climate change.
- Provide adequate finance and financial mechanisms for Implementation of actions which range from energy efficiency and renewable energy to public safety and security, coastal protection and more.

Increases in carbon emissions are changing the global climate, triggering dangerous rises in sea levels, changes in rainfall patterns, bleaching of corals, eroding shorelines, and reducing fish stocks among others. All this is already changing the intricate ecological balance between islanders and their environment which has been their support base for thousands of years.

The children of AOSIS countries and the children of G8 and G20 countries will both inherit this planet – damaged or protected. We decide which it will be; you know our choice and we hope it is yours too.



www.aosis.info

email: aosis.grenada@gmail.com



Building biodiversity

As worldwide demand for energy and food increases, the Earth's biodiversity declines. How can we ensure future generations do not suffer as a result?

Wildlife and traditional livelihoods are being threatened in Kenya's Tana River Delta by the upstream large-scale sugarcane plantations



Michel Laplace-Toulouse (www.africanlatitude.com)

By Wangari Maathai, Green Belt Movement

In my childhood, I remember I would visit a stream next to our home to fetch water for my mother. I would drink water straight from the stream. Playing among the arrowroot leaves I tried in vain to pick up the strands of frogs' eggs, believing they were beads. But every time I put my little fingers under them they would break. Later, I saw thousands of tadpoles: black, energetic and wriggling through the clear water against the background of the brown earth. This is the world I inherited from my parents.

Today, more than 60 years later, the stream has dried up and women have to walk long distances for water. Will our children know what we have lost? As I grew up I witnessed large sections of indigenous forests being

cleared and replaced by commercial plantations, with devastating destruction of the local biodiversity and the capacity of the forests to recycle and conserve water, regulate microclimates and contribute to the agriculture, livestock and wildlife sectors. Loss of biodiversity is a slow process. The negative impact is not always felt immediately and is easily passed on to future generations. The challenge is to restore the home of the tadpoles and give back to our children a world of beauty and wonder.

The world has been discussing environmental issues since the first United Nations meeting on the human environment in Stockholm, Sweden, in 1972. Since then much scientific knowledge has been added – including



The Green Belt Movement's tree-planting activities follow a 10-step programme that engages communities in forming tree nurseries and planting seedlings on public lands, degraded forest areas, and private farms

how the climate is changing, and what we can do to make biodiversity less vulnerable.

In Kenya, where I work, there is plenty of evidence of how the continuous loss of biodiversity is making life difficult for the present generation. Kenya has five forested mountains, which are water catchment areas for both the country and the broader region. One is snow-capped Mount Kenya, on the Equator, designated a biodiversity hot spot by UNESCO. Another is the Aberdare range, on the eastern side of the Great Rift Valley. Hundreds of tributaries from both mountains pour their waters into the Tana river, which is Kenya's largest river and the source of drinking water for millions of Kenyans. These two mountains are therefore very important ecosystems for Kenyans, their livestock and wildlife, affecting many economic sectors including agriculture, tourism, energy and household needs.

Yet as long ago as the early 20th century, large sections of these mountains were deemed suitable for pines from the Northern Hemisphere and eucalyptus from the Southern Hemisphere. Although these exotic plantations were intended to provide timber for the emerging building industry and firewood for the steam engine, they came at the expense of local flora and fauna, which were considered less valuable than the imported species.

The government also introduced a system where the forestry department allowed nearby communities to cultivate food crops while nurturing commercial seedlings. This way, they formed a symbiotic relationship with foresters, so that as they tended their food crops they assisted the foresters to nurture the exotic trees at no extra cost. I remember, as a child, seeing huge bonfires in the forests as the indigenous biodiversity was burned to make way for commercial plantations.

Unfortunately, with increased population, demand for agricultural land and corruption, more forest was converted into farmland. Demand for timber grew and even more indigenous forests were cut down. These plantations are harvested every 30 years and the cycle is repeated. The continuous planting, harvesting and replanting of the same commercial monocultures, accompanied by the long-term cultivation of food crops ensures that the local biodiversity of flora and fauna gradually disappears. After years of such a routine, even when the land was left fallow for almost 10 years, much of the original flora and fauna failed to return. Former forestlands are now grasslands.

The Tana river runs through some of the most populated parts of the country, with high potential agricultural land. Farming in this area depends on the health of the forested mountains. With the continuous destruction of their biodiversity, rain patterns will continue to falter. Even the cash crop production will be negatively affected.

When farmers fail to practise good techniques to stop soil erosion, land becomes degraded and unable to produce adequate food for household consumption. Hunger becomes a common phenomenon. Many small-scale farmers practising subsistence agriculture on such lands are among the poorest. They are unlikely to realise environmental sustainability. Such farmers are desperate to enter forests and expand agricultural land.

Plantations of exotic monocultures of trees are not forests, but rather tree farms. There is little of the original flora and fauna in such forests. Indeed, such plantations cannot provide the environmental services received from indigenous forests. When rain falls in commercial plantations, much of the rainwater runs downstream, carrying with it the top soil. It may cause floods. Eventually rivers either dry up or their water levels greatly diminish. This undermines both environmental sustainability and the eradication of poverty and hunger.

Massive deposits of soil in hydroelectric dams built across the Tana reduce the lifespan of the dams and

their capacity to produce adequate energy. Coupled with reduced water in rivers, this makes it difficult for the government to generate enough hydropower. Kenya faces a shortage of electricity, so poorer people in both rural and urban areas continue to use charcoal and paraffin as their main sources of energy, contributing to deforestation as well as greenhouse gas emissions.

In this International Year of Biodiversity, with ever more pressing demands on resources including food, water, land and clean air, the world cannot afford to repeat the mistakes of the past.

Throughout Africa, women are the primary caretakers, holding significant responsibility for tilling the land and feeding their families. They are often the first to become aware of environmental damage as resources become scarce and incapable of sustaining their families. Tree planting is a natural choice to address some of the initial basic needs identified by women. In many communities, tree planting is also simple and attainable. It guarantees quick, successful results. This supports the commitment of the participants and supporters.

Over the last three decades the Green Belt Movement has planted more than 45 million trees that provide

“With increased population, demand for agricultural land and corruption, more forest was converted into farmland”

fuel, food, shelter and income to support children's education and household needs. The activity also creates employment and improves soils and watersheds. Through their involvement, women gain power over their lives, especially their social and economic position and relevance in the family. But these are not problems restricted to poor, developing countries, or that only need to be addressed by local communities.

Many countries in the world that have their own land covered with forests and vegetation do conserve their biodiversity and enjoy a healthy and clean environment. However, some are able to do so because they engage in destructive logging and deforestation far away. That is why it is necessary to see the world as one planet – and protect not only the local but also the global environment. While some resources such as the huge forests' ecosystems in the tropics may be very far from temperate regions, their services have a positive impact on many other countries and regions. Their destruction will eventually be felt within borders far away from the forests themselves.

As the G8 and G20 meet to talk about our world and the problems we face, we must remember that whatever options we choose, it is always better to be guided by the common good, not only of today's generation, but also of generations to come. It is more expedient to sacrifice the long-term common good and the intergenerational responsibility for the convenience and opportunities of today. But we are morally required to take the better options for the common good of all. We have a responsibility to protect the rights of generations which cannot speak for themselves today. ♦

Biochemicals and biomaterials: an opportunity to accelerate economic growth while addressing environmental challenges

At the 2009 G8 Conference, Nobuo Tanaka, Executive Director of the International Energy Agency called on global policymakers to “take a holistic approach when they consider investments in new technologies. They should consider the impact of their investment on the whole energy system and choose to invest first in technologies that are compatible with the existing system or will enable the development or deployment of other technologies.”

Mr. Tanaka's approach to supporting new technologies can help policymakers make important choices, but will it be enough? Over the past ten years governments have focused on transportation fuels, neglecting biochemicals and biomaterials. At first glance, this is understandable; petroleum is used primarily to produce transportation fuels, while only 8% of every barrel of oil goes towards making chemicals and plastics. Yet the economic value created by chemicals and plastics is disproportionately higher than that of transportation fuels. In the US, chemicals and plastics generate US\$255 billion of GDP, while commercial transportation and transportation related manufacturing generate US\$350 billion.

Industrial biotechnology represents an opportunity for G20 economies to address several challenges. By harnessing industrial biotechnology to produce biochemicals and biomaterials, countries can produce safer, environmentally friendly products that have a meaningful impact on climate change, create green jobs, support their agricultural and forestry sectors and reduce their overall dependence on fossil fuels. Consumers across the G20 are seeking biobased products made from renewable resources that are compostable or biodegradable and reduce landfill accumulation, have better carbon footprints and are less harmful to both people and the environment. As a result of this growing demand, biobased product sales are projected to grow to \$390 billion by 2030.

In recent years, policymakers have focused on lignocellulosic and algae-based fuels. Government support has been largely oriented towards research and development because these technologies are still unproven and at a relatively early stage in their lifecycle. Support for biochemicals and biomaterials has been very limited by comparison, despite the fact that they are more advanced (in many cases at, or close to, the commercialization stage) and offer the prospect of greater economic benefit per dollar of investment (profitability, spin-off industries, jobs created).

Organic acids illustrate the benefits of biochemicals. Organic acids such as lactic acid and succinic acid that are produced via fermentation, rather than being derived from petrochemical feedstocks, can be used as building blocks in making a variety of polymers used in plastics and textiles. However, to be competitive biochemical production plants need to be situated near agricultural raw materials. Most G20 economies have arable land and thriving agricultural and/or forestry sectors that can be leveraged. Once these organic acids are produced, it is more efficient to immediately transform them into value added products, rather than shipping them halfway around the world. By using industrial biotechnology to produce basic organic acids, G20 economies can build a renewable chemical sector that draws on their agricultural strengths and creates a number of spin off industries that produce value added, biobased plastics, resins, polyesters and other products.

Several technologies have been developed that can produce organic acids cleanly and more cost effectively than the corresponding petrochemical processes. Many of these technologies sequester CO₂ in producing the organic acids, resulting in a negative carbon footprint. These technologies are ready for commercialization, but face a substantially slowed capital investment market, making it difficult to raise the money needed to build large-scale plants. While policymakers continue to promote “next generation” fuels that are a number of years from market, they offer little support to biochemical and biomaterial plants that will reduce dependence on fossil fuels, benefit local agriculture, reduce CO₂ emissions, generate green jobs and stimulate the economy.

Green technologies that have reached the commercialization stage do not require government grants, because they carry low risk relative to R&D stage technologies. What these technologies need are government loans and loan guarantees that can be used to secure the financing required for large-scale plants. By putting loan programs in place for commercially ready technologies, governments will accelerate the growth of biochemicals and biomaterials and facilitate the creation of bio-economy clusters.

Nobuo Tanaka may have had biochemicals and biomaterials in mind when he spoke about technologies that policymakers should champion. G20 countries can make meaningful progress towards their energy, environment and economic policy objectives by putting in place loans that facilitate the deployment of biochemical and biomaterial production plants.



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Fossil fuel subsidies and the G20

Phasing out fossil fuel subsidies will take clear leadership and strong political reform. The G20 has a key role to play in implementing such strategies

By David Runnalls, president, International Institute for Sustainable Development

Eliminating subsidies for fossil fuels is imperative for achieving climate change, energy security and poverty alleviation goals. Removing these subsidies has the potential to reduce carbon dioxide emissions dramatically, open investment pathways for cleaner sources of energy and free vast sums of money – for both developed and developing countries – to reduce fiscal debt or spend on healthcare or education.

Although the benefits are apparent, overcoming the political and practical challenges of subsidy reform is not easy. The leadership and collaboration demonstrated by the G20 leaders at their Pittsburgh Summit in September 2009 must be strengthened in Toronto and Seoul to support domestic reform efforts to overcome those challenges and progress on their medium-term commitment to phase out fossil-fuel subsidies.

What did leaders commit to in Pittsburgh?

At Pittsburgh, G20 leaders recognised that “inefficient fossil fuel subsidies encourage wasteful consumption, distort markets, impede investment in clean energy sources and undermine efforts to deal with climate change”. They pledged to “rationalise and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption”.

They also acknowledged the challenges ahead, notably the need to prevent adverse impacts on the poorest by providing targeted cash transfers and other poverty-alleviation mechanisms.

To advance the initiative, G20 leaders made a number of requests. They asked their energy and finance ministers to prepare implementation strategies and timeframes, based on national circumstances, and report to the Toronto Summit in June. They called on the International Energy Agency, the Organisation for Economic Co-operation and Development, the Organization of Petroleum Exporting Countries and the World Bank to report to Toronto on the scope of energy subsidies with suggestions for implementation. They requested that the international financial institutions offer support to countries for this initiative, and they called on all countries to adopt policies that will eliminate inefficient fossil fuel subsidies worldwide.

What has the G20 done since?

Since the Pittsburgh Summit, G20 finance ministers have reaffirmed their leaders’ commitment at St. Andrews, Scotland, in November and then in April 2010 at Washington DC.

Foreign affairs, finance and energy officials in G20 capitals have engaged in an informal dialogue, through

teleconferences and meetings (in Paris in February 2010 and Washington in April 2010). Officials agreed to develop implementation strategies in two phases. First they should list all their fossil fuel subsidies. Then they should list their national implementations plans to reform those subsidies. They drafted a template for preparing the plans. They also agreed on a timeline of meetings and submission deadlines prior to the Toronto Summit.

Officials also discussed the scope of the initiative as well as the definition of a subsidy and terminology such as ‘inefficient fossil fuel subsidies’ and ‘wasteful consumption’ in the leaders’ statement. They agreed not to adopt a commonly agreed definition of a fossil fuel subsidy, but that producer subsidies should be included in the initiative. Officials have reviewed early drafts of the report by the four international organisations and also country-specific issues such as the draft subsidy lists.

In preparing their report, the four intergovernmental organisations undertook an extensive consultative process, including meeting with G20 officials and civil society representatives in Paris in February 2010. Their report covers identifying and measuring the impacts of energy subsidies, some of the key challenges of subsidy reform and lessons learned from country experience, in addition to a roadmap for policymakers. The draft was presented to finance ministers at their meeting in Washington in April 2010.

What more needs to be done?

Much remains to be done. The implementation plans must be finalised and put into effect. According to the timeline set by officials, national subsidy lists and implementation plans were submitted to the finance meetings in Busan, Korea, on 4-5 June. There may be more negotiations prior to the Toronto Summit on 26-27 June, at which the final lists and plans should be reported. Not all members will be able to report finalised implementation plans by then; the remainder will report to the Seoul Summit in November 2010.

Although the intergovernmental organisations’ report reviews the challenges of fossil fuel subsidy reform, more detailed research and analysis are needed, particularly at the country level, to identify subsidies, their scale, their impacts and the measures necessary to overcome challenges to reform. In order to facilitate data collection and reporting, more work is required to overcome methodological gaps and difficulties in estimating fossil fuel subsidies.

The G20 must monitor national implementation plans to ensure the G20’s goals are met. Members must periodically review their subsidy lists as more information is gathered and analysed and new policies are developed.

“Champions are needed to maintain the political momentum necessary to keep reform of fossil fuel subsidies on the G20 agenda”



Options for doing so could include national reporting to G20 summits with peer review, improving compliance with notification requirements under the World Trade Organization's Agreement on Subsidies and Countervailing Measures, establishing a secretariat to share information and reports, or delegating functions to existing organisations – membership-based intergovernmental organisations or independent non-governmental organisations.

Champions are needed to maintain the political momentum necessary to keep reform of fossil fuel subsidies on the G20 agenda beyond June 2010. This leadership needs to come from the so-called troika of the United Kingdom, Korea and France as chairs of the G20 to ensure that G20 members comply with their commitments. The difficult challenges of subsidy reform arise during implementation. The political commitment needs to be strong in order to see reform succeed.

For the long term, the goals should be to expand the initiative to other countries, negotiate an agreement with

“ The G20 should issue a statement on the G20's long-term commitment to keep reform of fossil fuel subsidies on their agenda ”

The 2,000-megawatt coal-fired Eggborough electricity power station, UK: inefficient fossil fuel subsidies need to be reduced dramatically

subsidies reduction commitments and establish a formal secretariat. The International Institute for Sustainable Development has prepared a roadmap, *Homing In on Fossil Fuel Subsidy Reform: A Roadmap for International Cooperation*, of how this could be achieved. The G20 process is the vital first step.

Recommendations for the G20 Toronto and Seoul Summits

At their summit in June, G20 leaders should review the subsidy lists and national implementation plans, and agree to put them into action. They should agree to review and finalise the remaining subsidy lists and plans at their next summit in Seoul. They should issue a statement on the G20's long-term commitment to keep reform of fossil fuel subsidies on their agenda, and they should request their ministers to prepare options for monitoring and review and report back at Seoul. They should also request that international organisations conduct further research and analysis, including country-specific data collection, assessments of impacts and key issues, requests for technical assistance and best practices.

When they meet in Seoul on 11-12 November, the G20 leaders should finalise the remaining subsidy lists and national implementation plans. They should agree to make them publicly available. They should review options for a monitoring and review mechanism, agree on a preferred option and delegate functions accordingly. They should also ensure that reform of fossil fuel subsidies remains on the G20 agenda for the next 12 months. And, finally, they should continue to seek support and technical assistance from organisations and delegate long-term roles. ♦



Biodiversity and human wellbeing



*Dr. Aminu Zakari
Director, Centre for
Climate Change and
Environmental Studies*

Human actions are fundamentally, and to a significant extent irreversibly, changing the diversity of life on Earth, and most of these changes represent a loss of biodiversity. Changes in important components of biological diversity were more rapid in the past 50 years than at any time in human history. Projections and scenarios indicate that these rates will continue, or accelerate, in the future.

Virtually all of Earth's ecosystems have now been dramatically transformed through human actions. Over the past few hundred years, humans have increased species' extinction rates by as much as 1,000 times background rates that were typical over Earth's history.

Why is biodiversity loss a concern?

Biodiversity contributes directly through provisioning, regulating, and cultural ecosystem services, and indirectly through supporting ecosystem services to many constituents of human wellbeing, including security, basic material for a good life, health, good social relations, and freedom of choice and action. Many people have benefited over the last century from the conversion of natural ecosystems to human-dominated ecosystems and the exploitation of biodiversity. At the same time, however, these losses in biodiversity and changes in ecosystem services have caused some people to experience declining wellbeing, with poverty in some social groups being exacerbated.

Managing Africa's water in a changing climate

Throughout history, African societies have experienced various climate-related events and pressures. But over the past 30 years, both drought and floods have increased in frequency and severity. The continent is now burdened with nearly one-third of all water-related disasters that occur worldwide every year.

A warmer Earth may lead to many projected changes over the coming decades, including more extreme weather events, widespread drought and flooding, sea level rise and retreating glaciers. Africa has already experienced these, especially changes in rainfall patterns and rising sea levels. It will most

likely experience each in greater intensity in the future; the Intergovernmental Panel on Climate Change states that Africa is the most vulnerable continent to projected climate changes.

Widespread water scarcity on the African continent is expected to be further aggravated by a number of emerging threats. These include climate change, as well as an increasing population and the subsequent increasing demands for water. Around 25 African countries are expected to experience water scarcity or water stress.

Impact of water scarcity

Climate change has the potential to impose severe pressures on water availability and accessibility. Currently, 300 million Africans (more than 35 percent of the population) have no access to safe drinking water, and 313 million lack basic sanitation. According to the United Nations, sub-Saharan Africa (with the exception of Uganda and South Africa) is failing to meet the Millennium Development Goal targets to halve the number of people without access to clean water or sanitation by 2015. Climate change is expected to make it even harder to achieve these targets.

Africa has the highest population growth rate in the developing world, and food production is not keeping pace. Two of the most limiting factors to improve food production are the quality and quantity of available water resources. Rainfall variability in many regions of Africa directly affects agricultural productivity – rainfall is the most relevant climatic variable of food production in Africa. As rainfall becomes more variable, feeding Africa's rising population will become an even greater challenge.

Disputes and conflicts over water in Africa

Since food scarcity is directly linked to water availability and accessibility, increasing water scarcity will increase the potential for conflict within and between countries. The Darfur dispute in western Sudan stems in part from competition over water, mainly between different resource users; nomads and farmers share water and land in the region, but these are both getting increasingly meager due to climate variability and expanding desertification.

The increasing severity and scale of impacts resulting from climate change is likely to exceed the coping capacity of many communities and countries in Africa. This situation could lead to severe socio-economic and environmental impacts and will require additional adaptation efforts.

Climate change and its impact

Whilst land degradation has already taken and continues to take its toll, climate change poses another real challenge to Nigerian agriculture.



Nigeria is expected to be hard hit by climate change. The most vulnerable sectors are agriculture, water resources and human health. It is predicted that climate change could lead to increased water stress, overall reduction in agricultural productivity and yields, and expansion of habitats of vectors of diseases such as Malaria.

Over the last five decades frequency of occurrence of extreme weather events such as drought and flood show an increasing trend. Particularly since the 1980s, droughts of various intensity have occurred every four or five years and the recurrence seems to be more frequent since 1997. Seasonal and inter-annual rainfall variability has increased and temperatures continue to rise.

Community based rehabilitation of degraded lands: an effective response to climate change in Nigeria by the Centre for Climate Change and Environmental Studies

Agriculture is the mainstay of the national economy, the major driver of the economic growth before the discovery of crude oil in Nigeria and employs close to 65 percent of the total population. Performance of the sector over the past three to four decades has been characterized by large fluctuations. Despite steady agricultural growth, it has failed to keep up with the increasing demands of the growing population. Agricultural productivity is poor due to many factors such as erratic rainfall and frequent drought, soil fertility exhaustion, and land degradation.

The Centre For Climate Change has recognized that addressing the root causes and reversing the problem of land degradation is a development priority. The Centre has developed community-based approaches to effectively rehabilitate degraded lands and improved livelihoods.

Land degradation and its impacts

Land degradation, which can be broadly defined as reduction in the biological productive capacity of land under a specified form of use and management, is a problem of catastrophic proportion in Nigeria. It is a major immediate cause of the country's low and declining agricultural productivity (4-5 percent annually), persistent food insecurity, and prevalent rural poverty. Land degradation in Nigeria is a result of complex and interacting degradation processes including adverse changes in soil, water, vegetation, biodiversity, and local climatic resources. Loss of vegetation cover and soil erosion by water are the two most important forms of land degradation in Nigeria.

Enhancing community resilience towards climate change through integrated watershed management – lessons from the Centre's Project

Communities participated in the different stages of watershed management planning and monitoring: mapping of village resources and development plans, problem identification, and evaluation of their achievements. Active participation of women



has been one of the strengths of the Centre for Climate Change in carrying out village and community projects.

Trees provide many things: food, shade, wood-energy, building and fencing materials. They regulate micro-climates and rainfall patterns, hold soil to the ground, serve as habitats for other life forms and help to harvest and retain rainwater. They sequester carbon and thereby clean the air.

Among the lessons learnt in the past few years by the Centre for Climate Change and Environmental Studies is that tree planting continues to bring communities together, builds a common purpose, more sustainable livelihoods, and over time, builds resilience. Successful tree planting also requires capacity, commitment, proper financing, political will and good governance. It demands ownership by communities involved, respect for rights and, most importantly, that local people remain united behind a common vision.

Preventing deforestation and increasing tree cover is challenging but the rewards to communities and countries are manifold and provide benefits far beyond simply absorbing carbon.

Trees and forests have a significant role to play in a global climate deal when the trees are planted in the right places and their survival is ensured. They must also simultaneously improve the livelihoods of local communities. The Centre for Climate Change's integrated and holistic approach to climate change addresses livelihoods of community's adaptation, mitigation and sustainable development.

As we continue, we thank our partners for joining us on the journey to reduce the vulnerability of communities to climate change by not only continuing to plant trees, but by also reducing deforestation and forest degradation.

Centre for Climate Change and Environmental Studies
 No. 5 Elbe Close, Minister's Hill, Panama Street, Maitama
 P.O.Box 19081, Abuja, Nigeria

Tel: +234 803 821 3028
 Tel: +234 805 068 3373
 Tel: +234 (0) 9 874 9778
 email: info@center4climatechange.com
 aminu.zakari@center4climatechange.com
 website: www.center4climatechange.com

Office Annex:
 Centre for Climate Change and Environmental Studies
 Suite A56. Bannex Plaza
 Aminu Kano Crescent, Wuse 11
 Abuja, Nigeria
 email: info@center4climatechange.com
 website: www.center4climatechange.com



The contribution of business to sustainable development

New partnerships and stronger collaboration between the private and public sectors are being established to promote an efficient global economy that is also ecologically efficient

By Björn Stigson, president, World Business Council for Sustainable Development

The weak outcome of the United Nations Climate Change Conference in Copenhagen last December has left many people shaken by the fact that the world could not agree on how to address an obvious and very serious risk for global society.

It was also a wake-up call signalling a new phase in global relations that will be led by national and sectoral actors – in other words, smaller ‘clubs’ of countries helping to resolve specific issues with companies partnering alongside governments to deliver national plans and targets.

A new world order is arising

There is today a power shift from West to East and from the old G8 to the newer, bolder G20, a shift that reflects the growing importance of the leading developing countries. Even the earlier unrivalled position of the United States is now being challenged, and China is appearing as an ally of the United States. The global governance system via intergovernmental bodies has proven its limits in managing significant challenges and defining common positions on sensitive issues such as equity and burden sharing. All of this is happening against the backdrop of a financial crisis and economic recession that has swept away century-old multinational corporations.

Yet, amid the doom and gloom, there is a glimpse that the world is going green. A green race has started among governments and companies to become the leading suppliers – and ultimate winners – of resource- and carbon-efficient solutions. China is aggressively moving in this direction, and the European Union and Japan have already embarked on a green path.

New ways are clearly needed to manage global issues. But from where will global leadership emerge? Does the world have the right institutions to get there? These are key questions that the Muskoka G8 and Toronto G20 summits could help frame answers to.

A case in point: energy and climate

In many ways, the discussions on energy and climate change illustrate the need for a new governance model. The failure



A green race has started among governments and companies to become the leading suppliers of resource- and carbon-efficient solutions



The largest solar boat in the world, *PlanetSolar*, was built in Kiel, Germany. The 30 metre by 16 metre catamaran, topped with about 500 square metres of photovoltaic solar panels, will start its maiden voyage around the world in 2011

so far to agree on a new climate treaty raises questions about the structure and functioning of global governance and how to make this governance more effective.

No one would argue against the global nature of climate change and the need for everyone to take action. It is becoming increasingly clear, however, that these actions must be based on a common but differentiated responsibility. This is particularly timely given the current discussion about the distribution of economic benefits and costs among countries related to the climate issue. Who has got the right to what resources? Who is responsible for what pollution? Who is going to pay for it all?

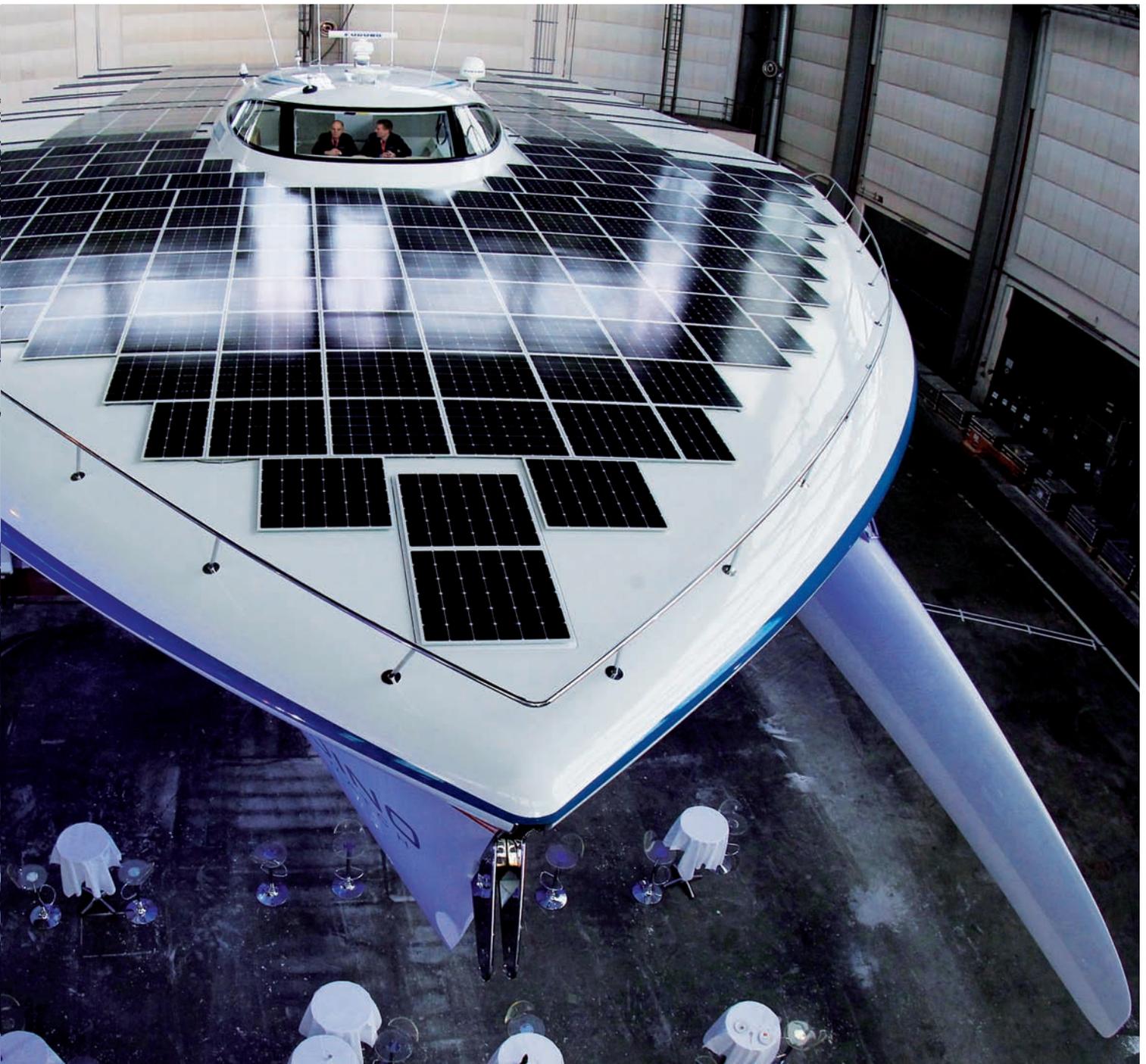
National and local actions are already happening and several countries have presented mid- and long-term voluntary targets. The key driver for companies to go forward in addressing climate change will be competitive advantage – that is, generating green growth, investments, jobs and shareholder value. It may even be possible that by

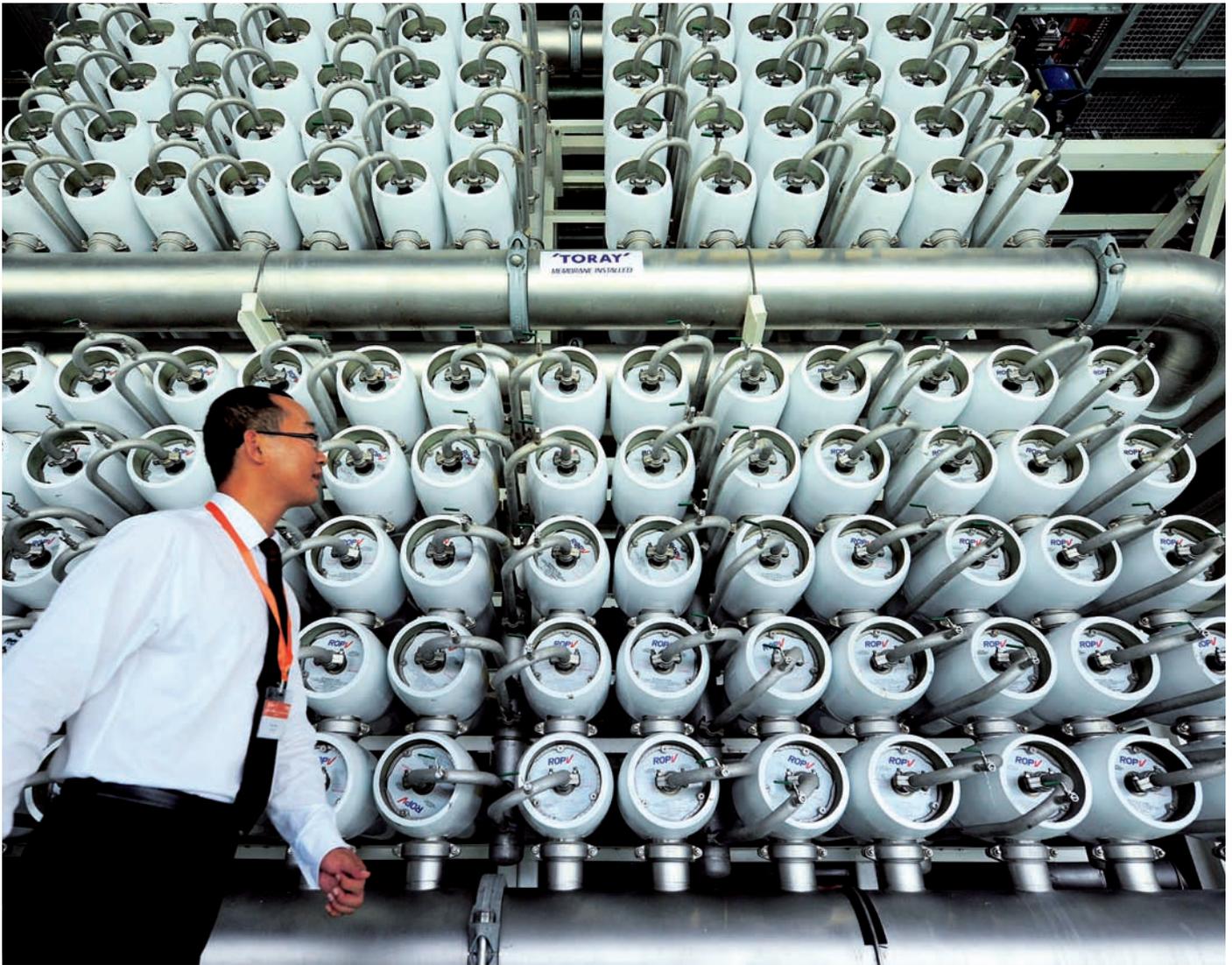
“By necessity and default, the world is in a transition to sustainability”

2030, up to 20 million jobs worldwide could be created in renewable energy alone, far more than would be achieved with fossil fuel-based energy.

Sustainable development requires systems thinking

By necessity and default, the world is in a transition to sustainability – but the scale of the transition is huge. Over the next 40 years the global population will nearly double,





An engineer inspects membranes used in the treatment of recycled water, in the newly opened Sembcorp NEWater plant in Singapore

with the vast majority of the growth in the cities of what is now the developing world. Simply put, the future is one of growth: of populations, cities and economic activity.

There will also be a massive surge in energy, transport, infrastructure, food and water needs, and a revolution needed in the solutions to meet them. Because of the overlap of agendas – energy, climate, development, trade and urbanisation – systems solutions are needed to coordinate them. This goes beyond creating more efficient products to redesigning supply and consumption, including how financial and human capital is mobilised and rewarded.

It also calls for new partnerships and stronger collaboration between the private and public sectors. In particular, a new model needs to be found for better cooperation between governments and business that can facilitate enabling regulation. Furthermore, as the main source of technology and funding for developing countries, business needs to step into political and diplomatic arenas where it was previously absent.

The transition to sustainability will undoubtedly foster commercial opportunities and a greater demand for green products and services from companies. Clearly, the world cannot become sustainable without business as a committed solutions provider.

Eco-efficiency is the way forward

The road to sustainability will be long and winding. However, business has a clear reason to contribute

“ The transition to sustainability will undoubtedly foster a greater demand for green products and services ”

because there can be no success in a society that fails. The world needs thriving, successful societies that are good places for doing business. Business wants to fulfill its role – to deliver goods and services that improve people’s lives – and achieve this with minimum pollution and resource use.

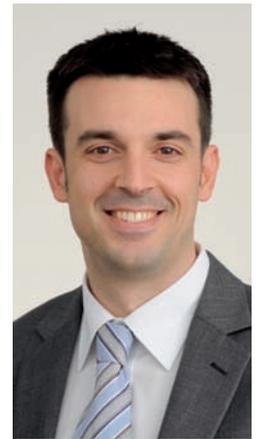
There is no conflict between being economically efficient and ecologically efficient – we can be eco-efficient. And we must be.

The last decade ended in confusion and uncertainty. Let the new one begin with renewed commitment and actions that will put the world onto a sustainable trajectory. This is the prerequisite to fulfilling the vision of everybody living well, within the limits of the planet. ♦

DJSI – the reference point for sustainable investors

The Dow Jones Sustainability Indexes are the world's longest-running sustainability benchmarks. Today they are used by global investors and asset managers seeking exposure to sustainable companies

By Dr. Rodrigo Amandi, Managing Director SAM Indexes



Sustainability issues such as climate change and resource scarcity shape today's hyper-competitive and fast-changing global business environment. SAM, the investment boutique focused on Sustainability Investing, is convinced that companies which implement sustainability practices can better anticipate and manage key economic, environmental and social opportunities and risks – and thereby create more shareholder value over the long term. That is why SAM and Dow Jones Indexes created the Dow Jones Sustainability Indexes (DJSI). Investors with exposure to DJSI based products will dually benefit – from superior long-term financial returns and from their ability to contribute to global sustainable development.

Sustainability pays off

Sustainability investing has become a mainstream investment discipline for good reason: empirical evidence shows that a forward-looking approach to environmental, social and governance issues is fruitful. Companies with longer-term strategies have emerged stronger from the recent crisis than peers focused solely on next quarter's profits. Moreover, sustainability portfolios are generating compelling investment returns. Since its launch in 1999, the world's leading sustainability benchmark, the DJSI World, has outperformed the broad-market MSCI World by 2.5 percentage points, returning 19% overall (USD, as of end of March 2010). Worldwide, investors have put more than USD 8 billion in financial products based on the DJSI, including: mutual funds, certificates, futures and exchange-traded funds (ETFs).

Strong platform for long-term returns

Launched in response to the need for reliable and objective benchmarks to manage sustainability portfolios, the DJSI family currently comprises a variety of global and regional benchmarks, with subsets enabling investors to apply filters against certain sectors or create customized indexes to suit their particular investment objective.

Reflecting SAM's extensive research expertise and the know-how of one of the world's leading index providers, Dow Jones Indexes, the DJSI monitor the performance of the leading sustainability-driven companies worldwide following a best-in-class approach. Index selection is based on SAM's annual Corporate Sustainability Assessments, which rate companies' financial strength as well as their relative performance in such areas as corporate governance, environmental performance, knowledge management, human capital development and stakeholder relations. They also identify the companies that best manage risks and opportunities deriving from sector-specific sustainability trends, such as the impact of climate change on innovation in the automotive industry. Only firms that lead their industries in all of these respects will be included in the sustainability indexes.

Positive incentives for better business

Being named to the DJSI is recognized as a badge of honor. As companies that do not progress as fast as their peers risk falling out of the indexes, the DJSI creates a strong incentive for companies to improve their sustainability credentials. Many companies use the feedback they receive from SAM's Corporate Sustainability Assessments as a trigger for change. An increasing number of them also now link their internal appraisals and performance-based payments to index inclusion.

Strong dynamics at play

Demand for sustainable investment approaches is bound to grow as investors seek companies with superior business models and long-term return potential amid increasingly acute global sustainability challenges. And while firms have come a long way during the last ten years, room for corporate sustainability improvements remains significant across all sectors. Investors will be watching companies' progress ever more closely – and the DJSI will continue to help them identify the leaders and the pioneers.

SAM is a global investment boutique focused exclusively on Sustainability Investing. The firm's offering comprises asset management, indexes and clean tech private equity. SAM partners with Dow Jones Indexes and STOXX Ltd. in the publication and development of the Dow Jones Sustainability Indexes (DJSI). As of December 31, 2009, SAM's total assets amount to USD 14.8 billion.



www.sustainability-indexes.com
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Today we care more and more about sustainability and yet we seem to know less and less about the materials that contribute to a sustainable future



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New ideas for the 21st century

British Columbia has embraced the modern mindset that acknowledges that economic and environmental policies need to be tackled together, on national and provincial levels, in order to build a prosperous and healthy world for all

By The Honourable Gordon Campbell, premier, British Columbia

Each time the G8 or G20 meet, there is reason for hope. The leaders who gather represent about 90 per cent of global gross national product, 80 per cent of world trade and two thirds of the world's population. Each time they come together there is an opportunity to focus the human family on shared goals.

The seismic shifts that have rocked the world recently have created great challenges, but they bear the unprecedented twin fruits of opportunity and obligation.

Having just hosted the 2010 Winter Olympic and Paralympic Games, we in British Columbia, Canada, are acutely aware of the power of the human imagination, the strength of commitment and the relentless pursuit of a focused objective. The world witnessed incredible performances that broke through the old barriers of excellence to new levels of accomplishment. The world also

witnessed the greenest Olympics in history. The Olympic Games inspired generations. Most importantly, the games remind everyone of the power of the human spirit.

Every gold medal athlete in the 2010 Olympic Games required new approaches to reach the top of the podium – from new nutrition to new technology, from sports psychology to dedicated training. Similarly, new mindsets are required to reach our global potential.

The 21st-century mindset recognises that economic and environmental policy cannot be dealt with in isolation. Together, they have enormous impact on the social and cultural development of the world. They can reinforce one another for good or for ill. No one is exempt and no one can escape the potent natural and economic forces that shape today's world.

The low carbon economy is the foundation upon which the world must build the global future. The technologies



Above: the Peace Canyon Dam and powerhouse, British Columbia. BC Hydro provides energy solutions in an environmentally friendly way

Below: British Columbia is a world leader in the production and export of softwood lumber, an environmentally friendly building material

that powered progress in the past need to be replaced with new technologies that reduce carbon, replenish the water, revitalise oceans and protect the natural diversity that feeds bodies and souls. While no country can do everything, every country, and most people, can do something to help meet these global objectives.

British Columbia has taken a number of steps to integrate economic opportunity with environmental responsibility. The province initiated North America's first revenue-neutral carbon tax in which every cent collected goes toward reducing personal and business income taxes. This allows people and businesses to save money while reducing their carbon footprint. It encourages business productivity and the creation of wealth rather than waste. It allows for no free riders. Critically, in British Columbia the revenue-neutral carbon levy is not designed as a way for government to take more from tax payers. It is a way of encouraging smart economic growth, and complements one of the most competitive tax environments in the world.

British Columbia is also working within the framework of the Western Climate Initiative with a number of



American states and Canadian provinces including California, Oregon, Washington, Montana, New Mexico, Utah, Ontario, Quebec and Manitoba. The goal is to develop a cap-and-trade system that harnesses the power of the marketplace to reduce carbon emissions in the western region of North America. By working with other regional systems, as well as the International Carbon Action Partnership, a truly global cap-and-trade system is possible.

“ British Columbia’s zero emission strategy is shaping its new clean energy initiative ”

British Columbia is also pursuing a new energy strategy to build on its energy portfolio. Currently, 90 per cent of the electricity consumed in the province is clean, with zero or near zero emission sources. BC's zero emission strategy is shaping its new clean energy initiative. It is also establishing new corridors for the expansion of natural gas to replace high carbon coal and to dramatically reduce emissions once again.

The new mindset requires a whole array of actions and allows the pursuit of many new opportunities. For example, BC is a world leader in the production and export of softwood lumber. There is no better environmental building material than wood. The province's Wood First Strategy assures that wood is used as the building material of choice in homes, schools, hospitals and all public buildings. Wood is the best building material in earthquake zones because of its flexibility and resilience. It is the least expensive and lowest carbon building product. A tree is a carbon sink and, when harvested, its wood remains a carbon storage vault. To further enhance this strategy of carbon reduction, British Columbia has introduced a zero net deforestation law.

Each of these efforts will help BC meet its goal of a 33 per cent reduction in carbon emissions for the province by 2020 and 80 per cent by 2050.

This is just one of the imperatives that will be confronted by G8 and G20 leaders. These steps are as important to the world's oceans and fisheries as they are to the land base and agriculture, because the global warming that has been occurring over the last 100 years also affects the world's oceans. Ocean chemistry, in turn, affects the entire global fishery. Again, British Columbia, Oregon, Washington, California and Alaska have recognised that the ocean does not respect national borders. That is why they have formed the Pacific Coast Collaborative: to share information, integrate policy and develop complementary research approaches that will lead to greater understanding and revitalisation of the Pacific Ocean and protection of valuable fishery resources.

While the world looks to the G8 and G20 for leadership, no one can wait for unanimity; nor can anyone wait to assume his or her own responsibilities. With action taken at the provincial or sub-national level, the links can be forged in an impressive chain reaction, where positive step reinforces positive step, where unnecessary barriers and institutional inertia give way to common purpose and positive action.

We live in an amazing time. Let us hope that future generations will look back at the G8 and G20 leadership of 2010 and be amazed by their wisdom and the boldness of their vision to create a better, healthier and richer world for all. ♦

Itron's Point of View

The way we manage the world's energy and water will shape this century

Fundamental to this vision are three core concepts:

- 1. How we apply technology will play a central role in how we meet environmental goals and mandates.**
- 2. The world's utilities need flexible solutions, rooted in reality.**
- 3. Empowered consumers will drive change in unprecedented ways.**

Itron's global experience in prepayment systems, smart grid and smart metering help to make these concepts a reality.



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Malcolm Unsworth, President & Chief Executive Officer, Itron Inc.