2011-2012

www.climateactionprogramme.org

CLIMATE ACTION

Assisting business towards carbon neutrality

FOREWORD BY ACHIM STEINER

IZABELLA TEIXEIRA
The Durban conference: a two track negotiation under the Bali Road Map

DR. JOSE GRAZIANO DA SILVA
Blind spots and converging agendas: climate and food security

ELIZABETH THOMPSON
Long hard roads to Durban and Rio

SPECIAL FOCUS ON AFRICA AND SUSTAINABLE CITIES

Published by:
green media

with:

Produced for: COP17, United Nations Climate Change Conference, Durban, South Africa, 28th November-9th December 2011

Bring clarity to your sustainability communications

clarity
Sustainability

Whatever their motivations, we can help you engage your audience with clear, compelling sustainability communications.

Our green marketing expertise

Sustainability Comms

Delivering credible communications and CSR activity that resonates with the customer and delivers results. We utilise our green customer segmentation, lower impact production methods and proven green marketing strategies.

Eco-innovation

We bring rigorous lifecycle thinking, propriety tools and marketing approaches to help you identify, innovate and capitalise on profitable new opportunities.

Green Engagement

Developing powerful, engaging communications programmes to generate involvement in sustainability initiatives, driving behaviour change and facilitating crucial conversations.

Contact us today to find out more:

Telephone: **0844 880 3535** Email: **hello@think-sustainability.co.uk**

Visit our website: **think-sustainability.co.uk**

CLIMATEACTION

Published by Green Media in partnership with the
United Nations Environment Programme (UNEP)

UNEP

UNEP promotes
environmentally sound practises
globally and in its own activities.
Climate Action is published by Green Media,
part of Henley Media Group.
It is printed on chlorine-free paper made from
wood pulp from sustainably managed forests.
All coatings are water based and the inks are from
renewable resources, e.g. vegetable, soy, linseed.

ISBN: 978-0-9563722-9-1
Published November 2011

Publishing Director:	Adam Nethersole
Project Director:	Sula Bruce
Account Managers:	Javier Ruiz Aparicio Michael Gray Petra Harkay
Editorial Manager:	Alan Bouquet
Sub Editor:	John Saunders
Marketing Manager:	Roopi Woodall
Website:	Linton Nightingale
Design:	Andy Crisp
Cover Design:	Tina Davidian
Print:	The Manson Group

Green Media
Henley Media Group Ltd
Trans-World House, 100 City Road
London, EC1Y 2BP, UK
Tel: +44 (0)207 871 0173
Fax: +44 (0)207 871 0101
www.climateactionprogramme.org

United Nations Environment Programme (UNEP)
PO Box 30552
Nairobi, Kenya
Tel: +254 20 762 3292
Fax: +254 20 762 3927
www.unep.org

Climate Action is available online. For more information, please visit: **www.climateactionprogramme.org**

The Publishers wish to thank all the individuals and organisations who have contributed to this book.

In particular we acknowledge the following for their help and advice in producing Climate Action:

Satinder Bindra, Director of the Division of Communications and Public Information, UNEP;

Kaveh Zahedi, Climate Change Coordinator, UNEP;

Fanina Kodre-Alexander, Head of the Internet Unit, UNEP;

Sophie Bonnard, Energy Branch, Division of Technology, Industry and Economics, UNEP.

FSC
www.fsc.org
MIX
Paper from responsible sources
FSC® C002002

Printed on:
FSC 90 Woodfree Silk
FSC 300 Woodfree Silk

Contents

7 **Foreword**
Achim Steiner, Under-Secretary-General and Executive Director UN Environment Programme (UNEP)

11 **Sustainable energy in Africa and the road to Durban**
Dipuo Peters, Energy Minister, Department of Energy, South Africa

14 SPECIAL FEATURE – ESRI: **Adapting to climate change. GeoDesign provides a framework for action**

16 **Wangari Maathai – A dedication**

CLIMATE POLICY, GOVERNANCE & FINANCE

18 **Sustainable energy: a critical element for the MDGs**
Helen Clark, Administrator, United Nations Development Programme (UNDP)

22 **Realising the promise of renewable energy**
Adnan Z. Amin, Director-General, International Agency for Renewable Energy (IRENA)

26 SPECIAL FEATURE – BRASIL FOODS: **Sustainability from the farm to the table**

27 **Blind spots and converging agendas: climate and food security**
Dr José Graziano da Silva, Director-General Elect, UN Food and Agriculture Organization (FAO)

30 SPECIAL FEATURE – AGROAMERICA: **Agroamerica's contribution to sustainable development**

31 **Celebrating the 2011 International Year of Forests**
Ahmed Djoghlaf, Executive Secretary, Convention on Biological Diversity

34 **Financing climate change investments in the developing world**
Stephanie Pfeifer, Executive Director, Institutional Investors Group on Climate Change (IIGCC)

37 **Water must be at the heart of climate talks**
Mr Loïc Fauchon, President, World Water Council

40 SPECIAL FEATURE – CONAGUA: **Water management – confronting climate change from Mexico to Durban**

42 **A climate for ending hunger**
Sheila Sisulu, Deputy Executive Director for Hunger Solutions and **Carlo Scaramella**, World Food Programme (WFP)

46 SPECIAL FEATURE – NEW HOLLAND AGRICULTURE: **Farming technology of tomorrow**

48 **Biofuels and food security**
Shenggen Fan, Director General, and **Tolulope Olofinbiyi**, Research Analyst, International Food Policy Research Institute (IFPRI)

51 **Engaging the market to reduce land-based emissions**
Toby Janson-Smith, Senior Director, Climate and Land Use: Markets and Policy, Conservation International (CI)

54 SPECIAL FEATURE – SCA: **True value creation for people and nature**

56 **Advancing the climate regime: pathways forward from Copenhagen**
Jennifer Morgan, Director, Climate and Energy Program, World Resources Institute (WRI)

60 **Off-grid renewable energy: an immediate solution to energy poverty**
Simon Rolland, Secretary General, Alliance for Rural Electrification (ARE)

63 **Investing in a green economy**
Oliver Greenfield, Convenor, Green Economy Coalition, and **Victor Anderson**, One Planet Economy Leader, World Wide Fund for Nature UK (WWF-UK)

66 **Private capital for a sustainable future**
Paul Clements-Hunt, Head of Unit, UNEP Finance Initiative

70 **Sustainable Energy for All: the energy access challenge**
John Christensen, Director of the UNEP Risoe Centre, **Morgan Bazillian**, Special Advisor to the Director-General of the UN Industrial Development Organization (UNIDO) and **Mark Radka**, Head of the UNEP Energy Branch

73 **Carbon trading: achievements, key lessons and future forecasts**
Henry Derwent, President and CEO and **Monique Motty**, Policy Director Assistant, International Emissions Trading Association (IETA)

SPECIAL FOCUS: AFRICA

78 SPECIAL FEATURE – NEDBANK: **Nedbank uses innovation to unlock the full value of 'green'**

80 **Putting farming first: encouraging an efficient, competitive agribusiness sector**
Lucy Muchoki, Chief Executive Officer, Pan-African Agribusiness and Agroindustry Consortium (PanAAAC)

83 SPECIAL FEATURE – VS HYDRO: **Climate change and the benefits of mini-hydro**

85 **Renewable energies: Africa's untapped leapfrogging potential**
Ansgar Kiene, Co-ordinator, African Renewable Energy Alliance (AREA)

88 SPECIAL FEATURE – EXXARO: **A multi-faceted mining response to climate change**

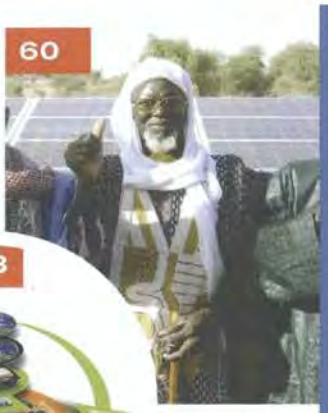
90 **Mining and climate change solutions in Africa**
Dr R Anthony Hodge, President, International Council on Mining and Metals (ICMM)

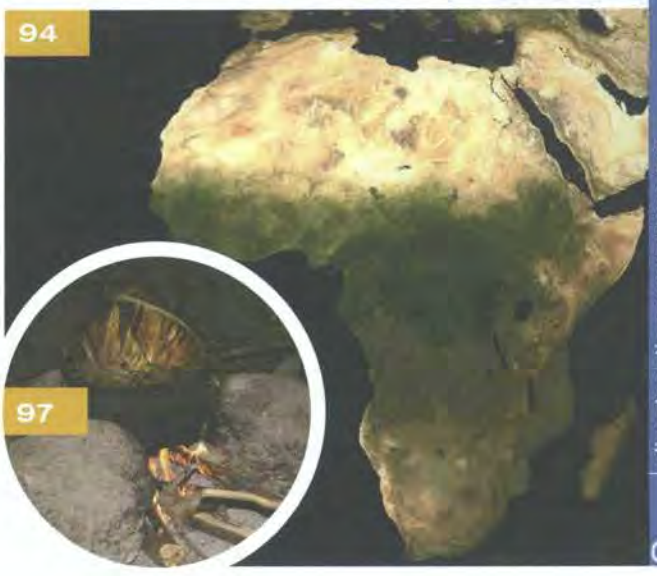
92 SPECIAL FEATURE – AIE: **African International Energy – a partner in the climate change challenge**

94 **Adaption to climate change: an African perspective**
Youba Sokona, Co-ordinator, African Climate Policy Centre (ACPC)

97 **Clean cookstoves: small intervention, transformational change**
Radha Muthiah, Executive Director, Global Alliance for Clean Cookstoves

100 SPECIAL FEATURE – SUNTECH: **The power of access – solar powering 20 million lives**





STEPS TO SUSTAINABILITY

104 SPECIAL FEATURE – RESEARCH IN MOTION: **Evolved EDGE: an efficient and cost-effective mobile broadband technology – with trial results**

106 **The role of ICTs in adapting to climate change**
Dr Hamadoun Touré, Secretary-General, International Telecommunication Union (ITU)

109 SPECIAL FEATURE – MTN Group: **Creating stakeholder value through sustainability**

112 **Transformative ICT solutions: a paradigm shift in Durban**
Luis Neves, Chairman of the Global e-Sustainability Initiative (GeSI)

115 **Supplier environmental certification and rating: the EPEAT experience**
Sarah O'Brien, EPEAT Outreach Director and **Jeff Omelchuck**, Director and EPEAT Executive Director, Green Electronics Council (GEC)

118 SPECIAL FEATURE – BARLOWORLD: **Barloworld Logistics innovates in the green supply chain**

120 **The challenge to green transport**
Niels Beuck, Policy Advisor and **Marco Leonardo Sorgetti**, Director General of the European Association for Forwarding, Transport, Logistic and Customs Services (CLECAT), Brussels

123 **Aviation's commitment to climate action**
Tony Tyler, Director General and CEO, International Air Transport Association (IATA)

126 **Enhancing sustainable energy in the Central American coffee sector**
Vera Espindola Rafael, Field Development Co-ordinator for Latin America and **Britta Wyss Bisang**, Standards & Certification Manager for UTZ Certified

129 **Safeguarding the environment with information disclosure**
Ernst Ligteringen, Chief Executive, Global Reporting Initiative (GRI)

132 SPECIAL FEATURE – NATUREWORKS LLC: **A decade of sustainable materials innovation: Ingeo, bioplastics from plants, not oil**

134 **Decoupling economic development and waste generation**
Dr Suzan Oelofse, Central Branch Chairperson, Institute of Waste Management of Southern Africa (IWMSA)

137 **Biochar use: a productive alternative to carbon storage**
Bruno Glaser, Institute of Agricultural and Nutritional Sciences, Martin-Luther University Halle-Wittenberg, Germany

140 SPECIAL FEATURE – EISENMANN: **Environment-friendly technologies for green production**

142 **Hydropower and climate change**
Cameron Ironside, Programme Director, International Hydropower Association (IHA)

145 **Assessing the supply chain for efficient production, cost and reputation**
Frances Way, Programme Director at the Carbon Disclosure Project (CDP)

CITIES OF THE FUTURE

152 SPECIAL FEATURE – AUTODESK: **The role of modelling for sustainable cities**

154 **Building better, greener societies for the planet and the economy**
Jane Henley, CEO, World Green Building Council (WorldGBC)

157 SPECIAL FEATURE – FREDERICIA MUNICIPALITY: **From garbage to gas – making a business out of a problem**

158 **Cities catalysing global climate action**
Yunus Arikan, Manager, Cities Climate Center, Local Governments for Sustainability (ICLEI)

160 SPECIAL FEATURE – BUILDING AND CONSTRUCTION AUTHORITY OF SINGAPORE: **Greening the built environment: a national priority for Singapore**

162 SPECIAL FEATURE – KEPPEL LAND: **Building strengths, defining distinctions**

164 **Buildings count for climate: a developing country sector response**
Dr Rodney Milford, Programme Manager, Construction Industry Development Board (CIDB)

168 SPECIAL FEATURE – PIO TRANS: **Rea Vaya – an environmental revolution in Johannesburg**

169 **Sustainable low carbon tranport: a weapon against climate change**
Michael Replogle, Founder and Policy Director and **Ramon Cruz**, Policy Consultant for the Institute for Transportation and Development Policy (ITDP)

172 SPECIAL FEATURE – BOMBARDIER TRANSPORTATION: **The planet is counting on our action**

174 **Sustainable energy efficiency in buildings**
Curt Garrigan, Coordinator, UNEP Sustainable Buildings and Climate Initiative (UNEP-SBCI)

177 SPECIAL FEATURE – SCHNEIDER ELECTRIC: **Smarter cities – more efficient, sustainable and liveable**

178 SPECIAL FEATURE – RAIZEN: **A strategic approach to sustainable development**

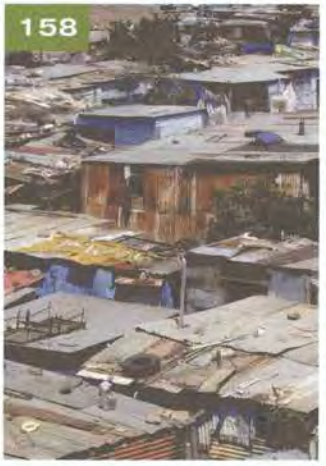
THE ROAD TO RIO

180 **The Durban conference – a two-track negotiation under the Bali Road Map**
Izabella Teixeira, Minister of the Environment, Brazil

183 SPECIAL FEATURE – CEMIG: **Way ahead in clean energy**

185 **Building corporate commitment to adaptation**
Georg Kell, Executive Director, United Nations Global Compact

190 **Long hard roads to Durban and Rio**
Elizabeth Thompson



We wish to thank...

THE GLOBAL COMPACT

Formally launched in 2000, the United Nations Global Compact is a call to companies everywhere to align their strategies and day-to-day operations with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption, and to take actions in support of the United Nations' broader objectives, such as the Millennium Development Goals. By doing so, business can help ensure that markets everywhere advance in ways that benefit both economies and societies. Requiring a leadership commitment to continuous performance improvement, the Global Compact seeks to assist businesses in the development, implementation, and disclosure of more responsible and sustainable corporate policies and practices. What began as a small platform with just over 40 companies has since grown to over 6,300 participating companies in more than 135 countries. Further supported by thousands of non-business stakeholders, the Global Compact is the world's largest corporate sustainability initiative – a platform for dialogue and learning, and a facilitator of organisational change.

WORLD GREEN BUILDING COUNCIL (WGBC)

WORLD GREEN BUILDING COUNCIL

The WorldGBC is a coalition of more than 90 national green building councils, making it the largest international organisation influencing the green building marketplace. The WorldGBC's mission is to facilitate the global transformation of the building industry towards sustainability through market driven mechanisms. The WorldGBC supports the creation of successful GBC's and ensures they have the resources needed to prosper, advocates the important role of green buildings in mitigating global climate change and promotes effective building performance rating tools and the development of mandatory minimum standards for energy efficiency in buildings.

ICLEI - LOCAL GOVERNMENTS FOR SUSTAINABILITY

ICLEI Local Governments for Sustainability

ICLEI is an association of over 1,220 local government Members who are committed to sustainable development. Our Members come from 70 different countries and represent more than 569,885,000 people. ICLEI is an international association of local governments as well as national and regional local government organisations who have made a commitment to sustainable development. ICLEI provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level. Our basic premise is that locally designed initiatives can provide an effective and cost-efficient way to achieve local, national, and global sustainability objectives.

CARBON DISCLOSURE PROJECT (CDP)

CARBON DISCLOSURE PROJECT

The Carbon Disclosure Project launched in 2000 to collect and distribute high quality information that motivates investors, corporations and governments to take action to prevent dangerous climate change. We further this mission by harnessing the collective power of corporations, investors and political leaders to accelerate unified action on climate change. We operate the only global climate change reporting system with 2,500 organisations in some 60 countries around the world now measuring and disclosing their greenhouse gas emissions and climate change strategies through CDP, in order that they can set reduction targets and make performance improvements.

WORLD BUSINESS COUNCIL ON SUSTAINABLE DEVELOPMENT (WBCSD)

wbcsd

The WBCSD is a CEO-led, global association of some 200 companies dealing exclusively with business and sustainable development. The WBCSD's Energy and Climate project helps companies reduce the impact of their operations and prepare for a carbon-constrained future by exploring energy frameworks, sources, and technologies while also devising practical mechanisms, measurement tools, and market-based solutions.

SUSTAINABLE ASSET MANAGEMENT (SAM)

sam sustainability investing

Founded in 1995, SAM is an 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 in the publication and development of the Dow Jones Sustainability Indexes (DJSI).

CONSERVATION INTERNATIONAL (CI)

CONSERVATION INTERNATIONAL

Building upon a strong foundation of science, partnership and field demonstration, CI empowers societies to responsibly and sustainably care for nature, our global biodiversity, for the long term well-being of people. CI is a leader in efforts to advance solutions that harness nature to mitigate climate change and adapt to its impacts from the local to global scale.

© UNEP

2012 is the International Year of Sustainable Energy for All.

Foreword

By **Achim Steiner**, UN Under-Secretary-General and Executive Director UN Environment Programme (UNEP)

Negotiations on how over 190 countries can move forward on climate change come to Durban, South Africa, amid concerns that the gap between scientific reality and political ambition remains firmly in place and may be widening. There are a multitude of encouraging developments – in 2010, for example, over US$210 billion was invested in renewable energies in countries from Germany to China, and from the United States to Mexico, Kenya and South Africa. And yet progress remains too far behind the curve in terms of the size, scale and pace of what is needed to keep a global temperature rise under 2°C this century.

Durban may not yield a definitive and decisive new climate agreement, but it cannot be a place for vacuous rhetoric.

Among the many achievements of the UN climate convention meeting in Cancun, Mexico, last year was the confirmation that the UN climate negotiations are at the centre of the international community's response, rather than a drift into segmentation and segregation post Copenhagen in 2009. This is the foundation upon which Durban needs to build and to move forward on several possible, practical fronts.

Several countries, such as the Democratic Republic of the Congo, Indonesia and Panama, are at advanced stages in taking part in what is known as Reduced Emissions from Deforestation and Forest Degradation (REDD or REDD+).

Deforestation currently accounts for around 17 per cent of greenhouse gas emissions. Paying developing countries to conserve rather than clear forests can thus play a central role in combating climate change and delivering multiple 'Green Economy' benefits, ranging from improved water supplies, conservation of biodiversity (such as the iconic orangutan), soil stabilisation and green jobs in natural resource management.

Norway, through the UN REDD programme of which UNEP is a member, is providing US$1 billion to Indonesia and a similar sum to Brazil. In Indonesia it has already triggered a moratorium on clearing new tropical forests for palm oil plantations.

During Durban, Forest Day will focus on the often forgotten issue of dryland forests, in particular in Africa.

A new report by the UN's Environmental Management Group, which as UNEP Executive Director I have the pleasure to chair, notes that dryland biodiversity provides important ecosystem services that benefit local communities.

For example, dryland forests and woodlands provide shade and moisture, are home to pollinators, protect nutrients and help reduce erosion and flooding. In addition to providing a large proportion of the world's food, drylands have contributed much to ecosystem services, including pharmaceuticals and raw materials.

Because of their huge extent, drylands can have major global climate benefits. For example, dryland carbon storage (mainly in the form of soil carbon) accounts for more than one-third of the global stock.

Durban also needs to move forward on launching the Green Climate Fund and providing options on how to generate the agreed climate finance of US$100 billion per year by 2020.

Meanwhile, governments also need to deliver tangible progress towards operationalising in 2012 the new technology and adaptation institutions that were agreed at the UN climate convention meeting in Cancun in 2010. These would send strong signals to Rio+20 in June next year – 20 years after the Earth Summit of 1992 that set the course of contemporary sustainable development and where the UN Framework Convention on Climate Change was established, along with treaties on biodiversity and desertification.

A few weeks ago UNEP published an indicator booklet as part of the build-up to our *Global Environmental Outlook* – 5 which will be launched in May next year – one month before Rio+20.

Among the indicators under the spotlight were:

- The global population in 1992 was 5.5 billion – it has now risen by 26 per cent.
- Plastics production has climbed by 130 per cent.
- Biodiversity has declined by 12 per cent.
- The number of people living in slums has risen by over 170 million.

«Deforestation currently accounts for around 17 per cent of greenhouse gas emissions.»

But there is also some good news.

- Substances that deplete the ozone layer have been cut by 93 per cent, and
- Globally drinking water coverage has expanded by 13 per cent.

In respect to climate change, however, the negative trends continue: greenhouse gas emissions have climbed 36 per cent since 1992, despite having treaties in place to stabilise and cut emissions.

The measure of the challenge – the size of the gap between ambition and reality – was underlined by a study, The *Emissions Gap Report*, released at the end of November 2010, compiled by UNEP in collaboration with modelling centres worldwide. The aim was to assess just what the commitments of developed countries and pledges of developing ones might mean in terms of keeping a 21st century temperature rise under 2°C.

International negotiations can often become opaque – the minutiae can dominate over the big picture and the aims. Meanwhile, many of the pledges made by developing nations in particular are contingent on other actions. Unravelling these various strategies in a clear and comprehensive way was the goal.

COP16, Cancun.

Fossil fuel subsidies range from US$400 billion to $650 billion per year, depending on the price of oil.

The Gap Report carried sobering but also inspiring conclusions. According to this assessment, global emissions should be around 44 Gigatonnes (Gt) of CO_2 equivalent in around ten years' time in order to have a good chance of keeping a global temperature rise under 2°C. If all the pledges made at and after the 2009 UN Copenhagen climate summit were met in full, including the financing pledges, there still remains a gap of 5Gt to 7Gt.

Clearly we need all hands on deck.

“Just eliminating fossil fuel subsidies... would provide 40 per cent of the carbon reduction needed to hold global warming to the 2º ceiling.”

Rio+20's two themes are a Green Economy in the context of sustainable development and poverty eradication, and an institutional framework for sustainable development.

UNEP's work on the Green Economy indicates that with the right policy measures and scaling-up of investments into ten key sectors, the global economy can grow and decent jobs be generated, but in a way that keeps humanity's footprint within ecological boundaries.

In respect to energy and climate, it points out that investing about 1.25 per cent of global GDP each year in energy efficiency and renewable energies could cut global primary energy demand by 9 per cent in 2020, and by close to 40 per cent by 2050.

- Employment levels in the energy sector would be one-fifth higher than under a business as usual scenario, as renewable energies take close to 30 per cent of the share of primary global energy demand by mid-century.
- Savings on capital and fuel costs in power generation under a Green Economy scenario would be on average US$760 billion a year between 2010 and 2050.

Governments are already exploring 'big ticket' co-operative items which could be agreed in Rio next June.

Fossil fuel subsidies range from US$400 billion to $650 billion per year, depending on the price of oil. Just eliminating fossil fuel subsidies, according to the International Energy Agency, would provide 40 per cent of the carbon reduction needed to hold global warming to the 2° ceiling.

Redefining and broadening GDP in order to capture externalities such as pollution and environmental degradation is another big ticket item being evaluated; as are the 2,600 bilateral energy agreements that work against rather than for promotion of renewables.

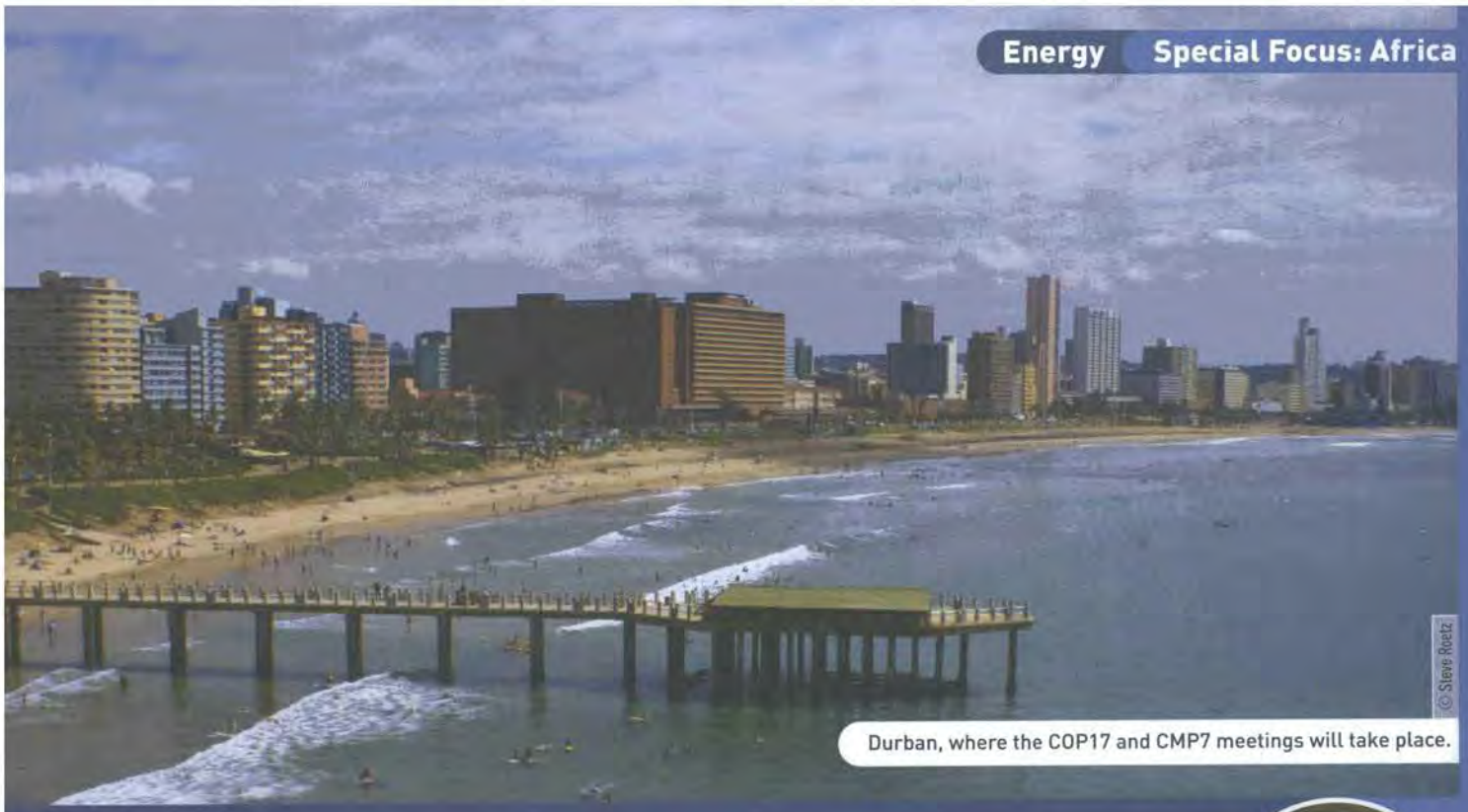
“Last year US$211 billion was invested in renewable energies across the globe.”

The green shoots of a Green Economy are sprouting everywhere:

- Last year US$211 billion was invested in renewable energies across the globe with the highest investments in such countries as China, but also rising ones in Africa and Latin America, as well as significant ones in Europe.
- In respect to solar, 17.5 GW was installed in 2010, up 130 per cent from 2009. And photovoltaic installations are forecast to rise further this year, by perhaps 20.5 GW, taking global capacity to around 50 GW – the equivalent of around 15 nuclear reactors.
- Sixty regional and local governments, responsible for 15 per cent of global greenhouse gas emissions, are also taking action. Québec and São Paolo, to cite just two examples, are aiming for cuts of 20 per cent below 1990 levels by 2020.
- Big companies, from banks to airlines, are contributing as well. The US retailer Walmart, for example, plans to cut emissions equivalent to 3.8 million cars, in part by implementing energy-efficiency measures at its Chinese stores.

The challenge for Durban and for Rio+20 is to find ways of scaling-up and accelerating what is already under way, and to decouple economic growth from resource use; while learning to see that combating climate and environmental change generally is as much an opportunity as a challenge that can redefine how today's seven billion people – climbing to over nine billion – can survive and indeed thrive in the 21st century.

Achim Steiner is UN Under-Secretary-General and Executive Director of the United Nations Environment Programme (UNEP). He has worked both at the grass-roots level and the highest levels of international policy-making to address the interface between environmental sustainability, social equity and economic development.



© Steve Roetz

Durban, where the COP17 and CMP7 meetings will take place.

Sustainable energy in Africa and the road to Durban

By **Dipuo Peters**, Energy Minister, Department of Energy, South Africa

The spotlight is falling on Africa and this is a critical time for its future. With the 17th Conference of the Parties (COP 17) of the United Nations Framework Convention on Climate Change (UNFCCC) and 7th Conference and Meeting of Parties (CMP) to the Kyoto Protocol upon us, the African Ministers of Energy convened in Johannesburg, South Africa on September 15 and 16, 2011 to discuss the priorities in creating a sustainable energy system. This article summarises some of these priorities and the actions that need to be taken to create and implement a sustainable energy system in Africa.

SUSTAINABLE ENERGY FOR ALL

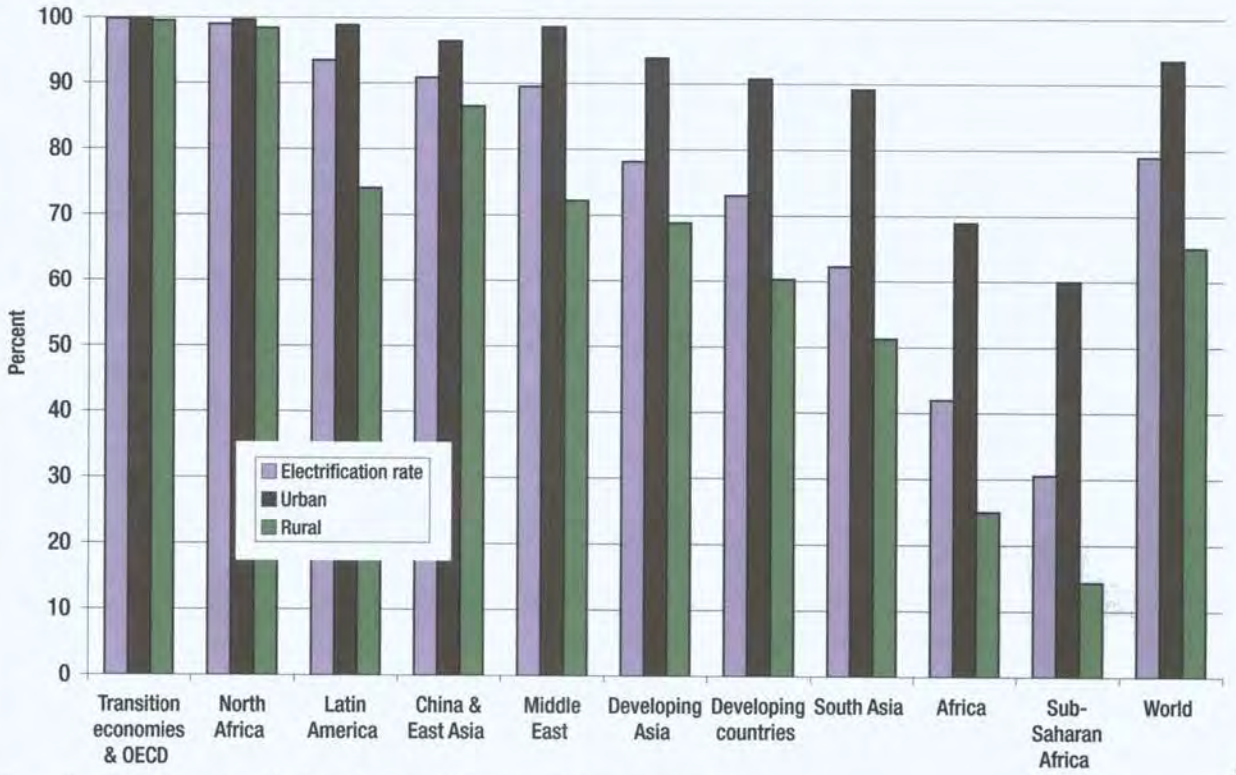
The past few years have brought about sweeping changes in policy. For example, the Maputo declaration created the Conference of Energy Ministers of Africa (CEMA) in 2010, charged with taking continent-wide decisions on the energy future of the region. The declaration emphasised the importance of developing renewable sources of energy, including biomass, solar and wave power, and of the importance of the Millennium Development Goals, urging developed nations, multilateral financial and commercial institutions and the private sector to actively support sustainable development in Africa.

The UN declared 2012 as the International Year of Sustainable Energy for All, which will offer a great chance to close the energy gaps and highlight opportunities for renewable energy in Africa; and so the South African Government welcomes the support of the UN in ensuring universal access to modern forms of energy for all by 2030, improving energy efficiency by 40 per cent by 2030, and doubling the global share of renewable energy by 2030. In aiming for this it must first be acknowledged that Africa has the lowest rate of access to modern energy among all continents, and that if no significant changes are made, it is projected that more people will be without energy services in 2030 than now.

> **“In sub-Saharan Africa, just one in three people have access to reliable electricity – the lowest rate in the world.”**

To quote some raw statistics, only 42 per cent of African citizens have access to electricity. In sub-Saharan Africa, just one in three people have access to reliable electricity – the lowest rate in the world. The entire power generation capacity of the continent stands at 124 GW, of which 30 GW is the total of sub-Saharan Africa (excluding South Africa). Not only is this energy not widely available, those that are connected to an energy supplier often have intermittent or unreliable supply.

Figure 1. Electrification rates worldwide.



Source: http://www.iea.org/weo/database_electricity10/electricity_database_web_2010.htm

Access to reliable, affordable and economical energy services is essential to reducing poverty and promoting equitable and sustainable social and economic development, and climate resilience, on the continent of Africa – while resource efficiency and green growth critically contribute to poverty reduction, job creation, green jobs, social development and a better environment.

PRIORITIES

To that end, what are the priorities for Africa and what should we focus on first? Access to energy needs to be improved. The focus should be on providing clean, modern and high quality energy carriers, especially looking to reduce the reliance on solid biomass which is both bad for the environment (soil erosion and deforestation) and health due to the indoor pollution which is responsible for premature deaths. Energy security must also be improved, through up-scaling and better co-ordination.

Africa is especially vulnerable to the negative impacts of climate change, and as a result we need to prioritise the resilience of our communities, infrastructure and economies in the face of these impacts. Country specific adaptation measures are necessary and early warning and modelling need to be improved.

Clean energy must be given priority. Africa is full of renewable energy opportunities and will be able to greatly enhance its economic, social and environmental development using a diversity of clean energy sources.

We also recognise the importance of localising supply chains, allowing South African workers to benefit from speedy developments and gain a knowledge base in local communities rather than relying on foreign workers. In a broader sense, we need to build technology and innovation capacity through undertaking appropriate research and development (R&D), developing our skills base and facilitating technology transfer to ensure that technologies are needs-driven and appropriate for local conditions. Also, experience has shown how demand side management and energy efficiency programmes can reduce costs, improve access and international competitiveness, while simultaneously reducing environmental impacts.

“The focus should be on providing clean, modern and high quality energy, especially looking to reduce the reliance on solid biomass.”

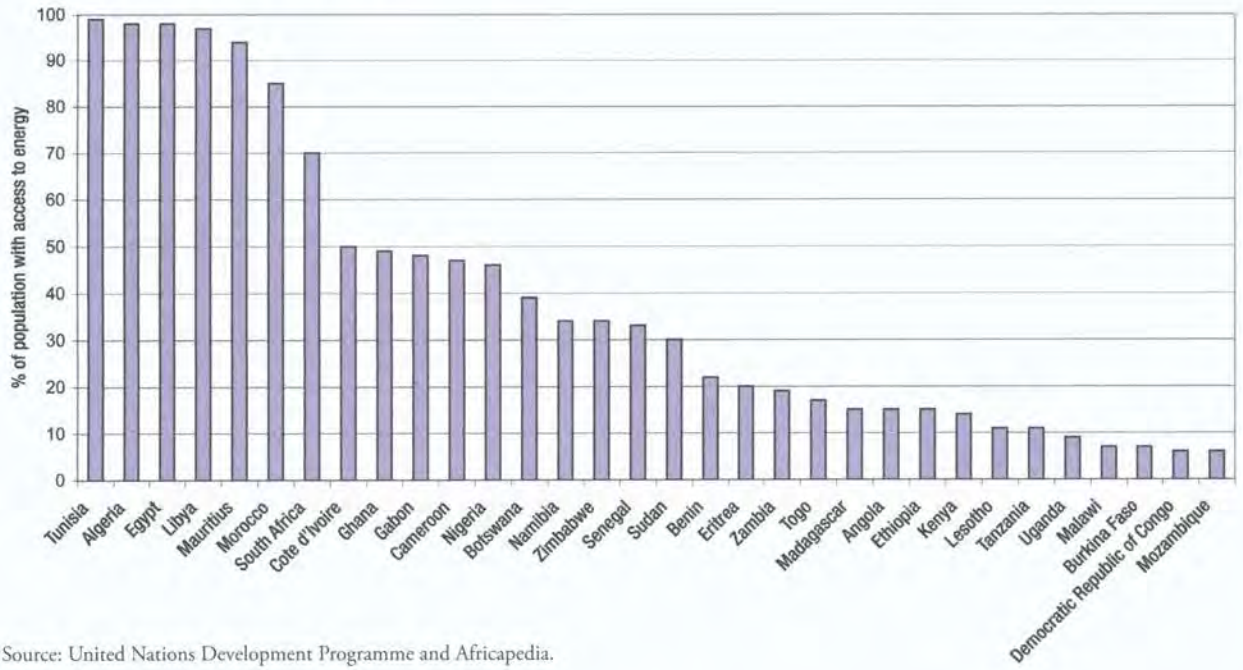
Integrated planning is also important in a rapidly growing sector. The energy sector does not operate in isolation; infrastructure elements such as regional inter-connectivity of electricity transmission and distribution power lines, pipelines, water and transport are interdependent. Integrated planning is critical to the sustainability and further development of our economies and societies.

THE PATH AHEAD

Identifying the problems is a relatively straightforward process. The next step is to decide what should be done in Africa. At the Johannesburg convention, we agreed to the following proposals as a plan of action:

- Support for an expansion of generation capacity with emphasis on renewable projects. Private sector investment on large scale projects is to be encouraged, but with

Figure 2. Energy access in Africa.



Source: United Nations Development Programme and Africapedia.

significant investment in project preparation so that environmental impacts can be considered. We urge the COP 17/CMP 7 to consider placing US$500 million as a corpus of grant funds to develop the next generation of national and regional generation projects, with emphasis on clean energy development. We also urge the support of large hydropower projects through inclusion in carbon market support.

- Enhanced funding for policy and institutional development activities, which will result in improved efficiency and effectiveness. This measure will improve transmission and distribution efficiency; adopt a loss reduction strategy; upgrade metering, billing and collection systems; invest in needed assets and efficient commercial technology for the distribution network; and improve corporate governance and ensure non-interference in procurement, financial and commercial operations. We encourage the Durban COP 17/CMP 7 policy-makers to promote this through support for technology transfer and human development systems.
- Energy planning and international co-operation: a sector-wide approach to scale up energy access has the potential to channel donor resources in a more sustained and cost-effective way. Given the scale of investments needed, a systematic and climate-friendly approach to planning and financing new investments is critical. Examples of this targeted approach should include grid extension in urban and rural areas where population density and distribution enables it to be cost-efficient; mini-grid and off-grid systems based on renewable energy technologies for dispersed populations; and low-cost home energy systems (e.g. solar, LED, geyser blankets, low flow showerheads, as well as efficient cook stoves) through development of markets for such products.
- Regional trade and energy resource development: enhanced support from development partners for scaling up regional energy trade and development of clean and renewable energy resources.
- The UNFCCC process has so far tended to prioritise the *mitigation* of emissions: we believe that *adaptation* to the negative impacts of climate change deserves balanced treatment. We call upon the COP 17/CMP 7 to ensure that this will be the case and that adaptation projects be included in the Green Climate Fund.

A MIXTURE OF SOLUTIONS

In conclusion, improvement of adaptation measures is key to combating climate change in Africa, while in order to create a sustainable energy future we must look to create a modern integrated system, utilising the vast renewable resources the continent has to offer. However, much relies on the UNFCCC and overseas investment to help facilitate this process, which, if implemented well, can lead to job creation and new skills for the African workforce. Universal access by 2030 is also a possibility, but an additional 512 million people, 460 million of them in the sub-Saharan region, need to be provided access to electricity to achieve this. It will require a mix of on-grid and off-grid solutions, a diverse range of energy sources, and co-operation not only from within Africa, but also from the international community, the private sector and NGOs.

Adapting to climate change

GeoDesign provides a framework for action

By **Jack Dangermond**, President and CEO, Esri

The Earth's climate is changing, leading to serious problems such as food security, health, and public safety for humanity.

As our environment changes around us, we need to adapt swiftly. But where do we start? Should we reinforce or rebuild existing structures? Or should we abandon existing settlements and relocate the population in some cases? And how can mass rebuilding/relocation efforts be best accomplished from the human, environmental, and economic perspectives?

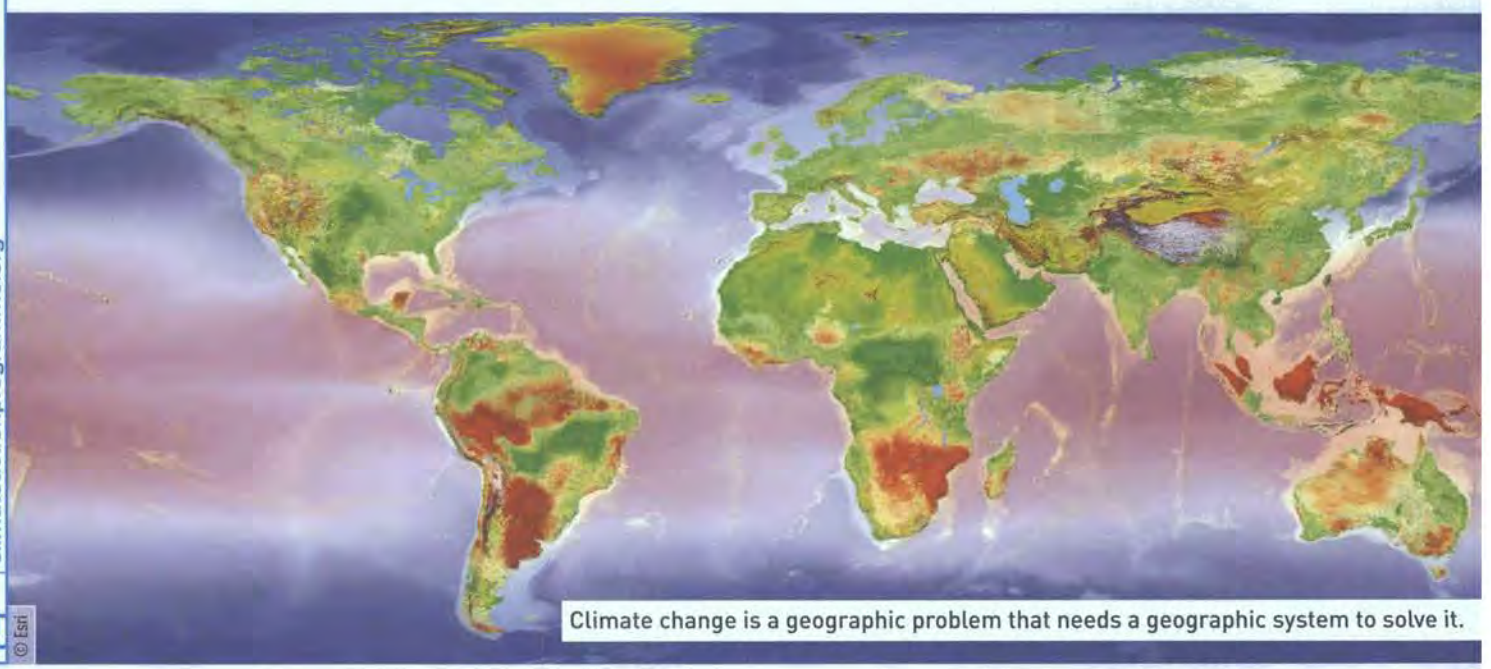
GeoDesign is a framework for understanding the complex relationships between human designed settlements and the changing environment, for quickly planning ways to adapt existing communities and build new ones in a more sustainable manner. This methodology helps us to assess risk, identify change, create synergies, develop strategies, adapt to change, and monitor the results. A merging of geographic information system (GIS) technology with spatial design principles, GeoDesign takes an interdisciplinary, synergistic approach to solve the critical problems of future design to optimise location, orientation, and the features of projects from local to global scales.

By bringing social, environmental, agricultural, meteorological, and other sciences into a common geographic perspective, people can better see the optimal solutions needed for planning and building our future. Governments, NGO's, businesses, and civil society communities already use the GeoDesign approach to minimise climate impacts, increase resiliency, predict cause and effect, calculate sustainability capacity, rank risk levels, allocate resources, and prioritise action.

By incorporating geographic technologies such as visualisation and modeling into the analysis of community development, people can intelligently answer far reaching design questions such as these.

The GeoDesign framework lets us design and test various alternatives, thereby helping to make the most educated and informed decisions for adapting human kind to a rapidly changing environment and world. It acknowledges the inseparable relationship between society and nature and lets us take an active role in designing where and how we live.

Climate change is a geographic problem that needs a geographic system to solve it. A GeoDesign-based framework for climate science gives us hope. With it we can gain a scientific understanding of Earth's complex systems at a truly global scale and make thoughtful, informed design decisions that ultimately allow communities and nature to coexist more harmoniously.



Climate change is a geographic problem that needs a geographic system to solve it.

GeoDesign lets us intelligently create initiatives for

- Land use
- Green infrastructure
- Irrigation channels
- Renewable energy sites
- Natural resource planning
- Sustainable forest practice
- Agriculture
- Fire management
- Natural disaster mitigation
- Health services
- Human migration
- Urban and rural development

...and more

HOW CAN WE MOST EFFECTIVELY LEVERAGE GEODESIGN TO GUIDE ADAPTATION TO OUR CHANGING CLIMATE?

Join the discussion at the Spatial Roundtable, where thought leaders come together to share their views about concerns, trends, challenges, and technologies. Working together we can leverage technology to help create a better world.
www.spatialroundtable.com

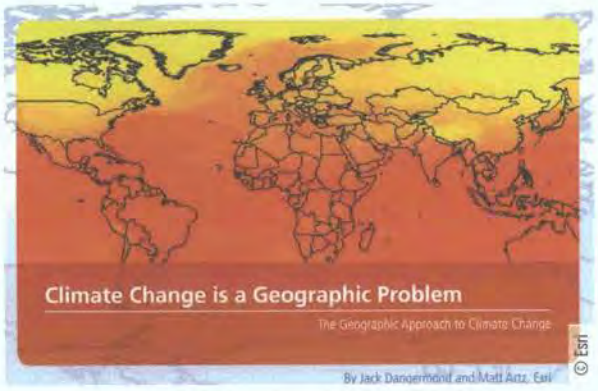
Jack Dangermond founded Esri with a vision that computer-based mapping and analysis could make significant contributions in geographic planning and environmental science.

Website: **www.esri.com/climate**

Read about the many ways GIS is already being used for climate change research on our website and see how Esri works with organisations worldwide to create GIS applications that meet the climate change challenge.

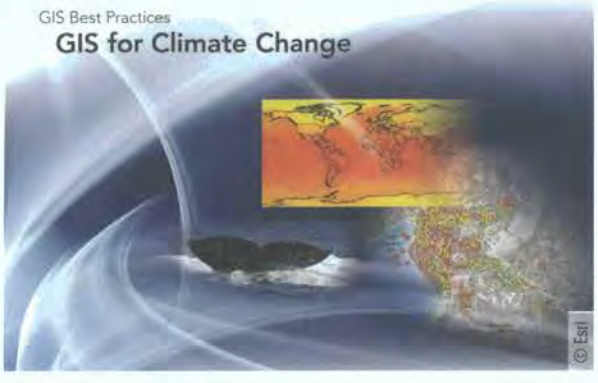
Visit **www.esri.com/climate** to receive your free e-book. Available e-book titles below:

CLIMATE CHANGE IS A GEOGRAPHIC PROBLEM



The geographic approach to climate change
A GIS-based framework for climate science helps us make thoughtful, informed design decisions that allow humans and nature to coexist more harmoniously.

GIS FOR CLIMATE CHANGE



Case studies in the use of GIS for climate change
Eleven case studies illustrate how GIS is helping us to gain a better understanding of the impact of climate change on natural and human systems.

Wangari Maathai A dedication

Climate Action would like to dedicate this publication to Wangari Maathai, the first African woman to win the Nobel Peace Prize, who died at the age of 71 on 25 September 2011 after a long battle with cancer. She won the prize for her devotion to forest conservation in Kenya, campaigning tirelessly on tree planting and conservation.

Maathai founded the Green Belt movement in 1977 which looked to improve the environment in an effort to better the lives of poor people and especially women. She particularly found forest conservation to be important. "It's a matter of life and death for this country. The Kenyan forests are facing extinction and it is a man-made problem," she said. Her movement has gone on to plant 47 million trees to fight deforestation.

Maathai's Nobel first was not a lone achievement. She became the first woman in Kenya to receive a doctorate for veterinary medicine, and be appointed a professor. She was a strong willed person, who fought for the African people and the environment and she sometimes suffered for this, being beaten in a demonstration against the sale of public forests in 1999.

Achim Steiner, UN Under-Secretary-General and UNEP Executive Director, said: "Wangari Maathai was a force of nature. While others deployed their power and life force to damage, degrade and extract short-term profit from the environment, she used hers to stand in their way, mobilise communities and to argue for conservation and sustainable development over destruction.

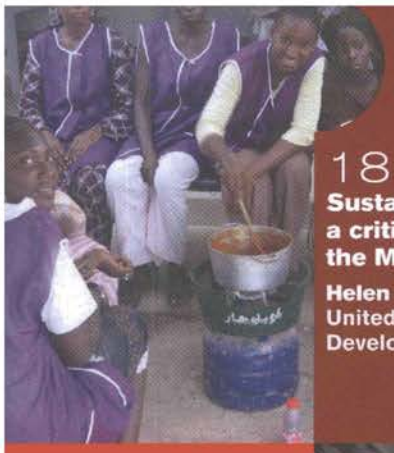
"She was, like the acacias and the *Prunus africana* trees Wangari fought so nobly and assiduously to conserve, strong in character and able to survive sometimes the harshest of conditions. She was also immovable in the face of ignorance, political gamesmanship and wanton environmental destruction," he said.

Perhaps her most powerful message was, "You cannot protect the environment unless you empower people, you inform them, and you help them understand that these resources are their own, that they must protect them."

Wangari Maathai was a force of nature, quite literally and the inspiration she provided should encourage more Africans to protect and care for their natural environment.

"You cannot protect the environment unless you empower people, you inform them, and you help them understand that these resources are their own, that they must protect them."

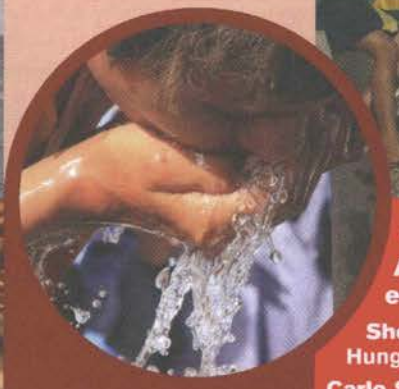
WANGARI MAATHAI, 1 APRIL 1940 – 25 SEPTEMBER 2011



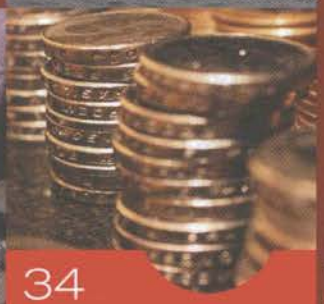
18
Sustainable energy: a critical element for the MDGs
Helen Clark
United Nations Development Programme

22
Realising the promise of renewable energy
Adnan Z. Amin
International Agency for Renewable Energy

27
Blind spots and converging agendas: climate and food security
Dr José Graziano da Silva
UN Food and Agriculture Organization



31
Celebrating the 2011 International Year of Forests
Ahmed Djoghlaf
Convention on Biological Diversity



34
Financing climate change investments in the developing world
Stephanie Pfeifer
Institutional Investors Group on Climate Change

37
Water must be at the heart of climate talks
Mr Loïc Fauchon
World Water Council

42
A climate for ending hunger
Sheila Sisulu
Hunger Solutions
Carlo Scaramella
World Food Programme

CLIMATE POLICY, GOVERNANCE & FINANCE

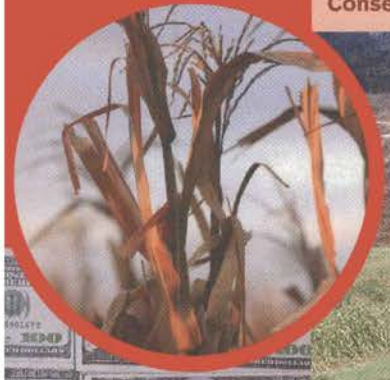
48
Biofuels and food security
Shenggen Fan
Tolulope Olofinbiyi
International Food Policy Research Institute

51
Engaging the market to reduce land-based emissions
Toby Janson-Smith
Climate and Land Use: Markets and Policy, Conservation International

56
Advancing the climate regime: pathways forward from Copenhagen
Jennifer Morgan
World Resources Institute

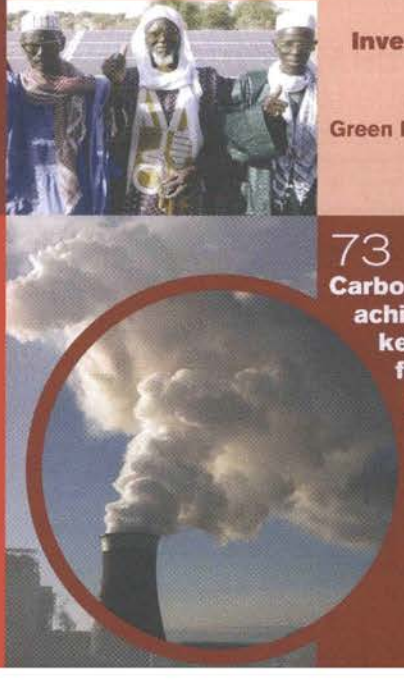
60
Off-grid renewable energy: an immediate solution to energy poverty
Simon Rolland
Alliance for Rural Electrification

63
Investing in a green economy
Oliver Greenfield
Green Economy Coalition
Victor Anderson
WWF-UK



66
Private capital for a sustainable future
Paul Clements-Hunt
UNEP Finance Initiative

70
Sustainable Energy for All: the energy access challenge
John Christensen
UNEP Risoe Centre
Morgan Bazillian
UN Industrial Development Organization
Mark Radka
UNEP Energy Branch



73
Carbon trading: achievements, key lessons and future forecasts
Henry Derwent
Monique Motty
International Emissions Trading Association

Sustainable energy: a critical element for the MDGs

Cleaner fuels and improved stoves reduce household air pollution.

By **Helen Clark**, Administrator, United Nations Development Programme (UNDP)

At the September 2010 UN General Assembly Summit to review progress on achieving the Millennium Development Goals (MDGs), world leaders acknowledged that, despite significant efforts and successes, much more needs to be done to reach the targets by 2015. One of the crucial elements of the action agenda they adopted was an emphasis on energy issues: access to affordable energy, energy efficiency, and sustainability of energy sources and uses.

THE CHALLENGE

About three billion people continue to meet their cooking, heating, and other daily needs by burning traditional biomass fuels (wood, charcoal, agricultural wastes or dung), and in some areas, pieces of coal. More than 1.4 billion people still lack any significant access to electricity, and an additional billion people have only unstable and erratic electricity supplies.

Business-as-usual approaches to energy access are clearly not adequate for accelerating the achievement of the MDGs. In addition to plans for extending electricity grids, decentralised energy options are urgently needed to reach the poor and those living 'beyond the central grids', along with motorised power for agricultural and income-producing enterprises.

BAN KI-MOON, UN SECRETARY-GENERAL:

"Expanding access to affordable, clean energy is critical for realising the MDGs and enabling sustainable development across much of the globe."

COMMITMENT TO 'SUSTAINABLE ENERGY FOR ALL'

In December 2010, the UN General Assembly designated 2012 as the 'International Year for Sustainable Energy for All' (Resolution 65/151). This provides a unique opportunity to strengthen global commitments and mobilise collective actions on sustainable energy. The General Assembly resolution followed recommendations made in April 2010 by the Secretary-General's Advisory Group on Energy and Climate Change. In their report *Energy for a Sustainable Future*, the Advisory Group identified two main priorities for enhanced effort and international co-operation – achieving universal access to modern energy services and strengthening energy efficiency.

In a January 2011 speech in Abu Dhabi, United Nations Secretary-General Ban Ki-moon emphasised the importance of the International Year for Sustainable Energy for All, and called for a "global clean energy revolution – a revolution that makes energy available and affordable for all."

The initiative calls for achievement of three goals by 2030: achieving universal access to modern energy services; doubling the rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix. Ensuring sustainable energy for all is essential for meeting two of the most pressing challenges of our time – reducing poverty and mitigating climate change.

ACCELERATING PROGRESS TOWARDS THE MDGS

REDUCING POVERTY AND HUNGER (MDG 1)

Productive uses of energy significantly increase people's ability to generate income and improve their livelihoods. In rural areas, electric and mechanical power for irrigation and agro-processing do improve agricultural productivity and food security. A survey associated with the UNDP-supported Multifunctional Platform Programme in Mali showed that mechanised agro-processing services using engines powered by diesel or biodiesel contributed to an average income increase of US$45 per year per beneficiary.

ENERGY IMPROVES THE PERFORMANCE OF SCHOOLS AND STUDENTS (MDG 2)

Lighting extends the hours available for studying, and electronic equipment provides greater access to learning tools and resources. A study on the impacts of electricity in rural villages in Nepal showed that communities with access to electricity spend more time and resources on education, have higher educational attainment, and are better able to retain trained teaching staff. Another important factor for educational performance is that access to modern fuels reduces the amount of time spent on gathering fuel wood, which enables children, especially girls, to spend more time in school.

BETTER ENERGY CONTRIBUTES TO GENDER EQUALITY (MDG 3)

The reality of life for many women and girls involves hours spent on strenuous labour each day – growing food, grinding grain into flour, cooking over a smoky fire, and collecting firewood. Access to energy reduces the time they spend on these chores, allowing more women to earn more income, and girls to attend school. Burkina Faso, for instance has introduced simple engines for village energy. These systems for agro-processing save women and girls an average of two to four hours per day.

ELECTRICITY AND CLEANER-BURNING FUELS IMPROVE HEALTH (MDGS 4, 5, AND 6)

Today, there are more people dying from smoke from biomass for cooking than from malaria or tuberculosis. Cleaner fuels and improved stoves reduce household air pollution and decrease the number of people suffering from respiratory infections, chronic obstructive lung disease, and other smoke-related health problems. Globally, two million people, mostly women and children, die annually due to indoor air pollution resulting from cooking and heating with solid fuels. Electricity can power health clinics, and allows refrigeration of vaccines and other life-saving medications.

NEPAL: SCALING UP DECENTRALISED, OFF-GRID ENERGY SYSTEMS

In Nepal, off-grid, community-managed micro-hydropower systems are bringing electricity to poor, remote hill communities beyond the reach of the national grid. Communities have experienced multiple MDG-related benefits, including increased household incomes, greater agricultural productivity, higher educational attainment, enhanced gender equality, better health outcomes, and better environmental quality. The systems were installed by Nepal's Rural Energy Development Programme (REDP), which uses community-managed micro-hydropower as the entry point for holistic development and poverty reduction. Over the years, UNDP and a large number of government ministries, donors, NGOs and private companies have been involved in supporting this programme, with a goal of reaching all 75 of Nepal's districts by 2012. The REDP systems account for about 40 per cent of all installed small-scale hydropower in Nepal, and are expected to supply electricity and mechanical power to about one million people by 2012.

CLEANER ENERGY SOURCES ARE NEEDED FOR ENVIRONMENTAL SUSTAINABILITY (MDG 7)

The energy system is responsible for about 60 per cent of total current greenhouse gas emissions. Fossil fuels are major contributors to climate change, and to urban air pollution and acidification of land and water. People in the poorest countries, who have contributed the least to the greenhouse gas emissions accumulation to date, suffer most acutely from the impacts of climate change.

Increased use of modern fuels and technologies which provide energy more efficiently than traditional methods will help reduce forest degradation associated with the use of wood fires for cooking, heating and lighting. Accelerated deployment of energy-efficient technologies and renewable energy systems will also decrease air pollution and greenhouse gas emissions.

INTEGRATING SUSTAINABLE ENERGY FOR ALL INTO MDG PLANS

Adopt and make political commitments. Sustainable energy access for all should be a top political priority in national development strategies and plans, including low-carbon and climate-resilient development strategies and MDG acceleration strategies. Developing some form of a National Action Plan or commitment to sustainable energy for all can foster predictable long-term policies and sustained actions.

Make science-based, informed decisions. The interconnected and multi-faceted nature of energy issues, as well as the dynamic nature of technological innovations, means that decision-makers require science-based, authoritative, evidence-backed analysis and information to support informed decisions.

Seek and build new public-private partnerships. All parts of society – public officials, private sector leaders, community organisations, academia, and businesses – need to be involved in developing plans and actions to promote energy access and sustainable energy for all. Particularly in areas where there is limited private sector capacity, public investments are needed to steer and catalyse the development of new energy-producing capacities by local governments, entrepreneurs, and communities.

Invest in Sustainable Energy for All. Increased public and private financing, including development finance, will strengthen enabling frameworks and institutional capacities and can create conditions for leveraging overall private sector capital for energy access, particularly in the Least Developed Countries and sub-Saharan Africa. For example, South Africa, with UNDP support, demonstrated one way to target investments and subsidies to the poor when it introduced a 'poverty tariff' which required utility companies to provide 20-50 kilowatt-hours per month of electricity free of charge to poor households. The income of those households increased, as did lighting and use of appliances.

EXPANDING ACCESS TO SUSTAINABLE ENERGY

Sustainable Energy for All and energy access for the poor remains a top priority. In collaboration with other agencies UNDP supports national commitments and plans to drive concrete interventions on the three national-level energy targets. UN Country Teams and the UN Resident Co-ordinators will deliver collaborative programmatic and policy initiatives on the ground.

To achieve these goals, the focus falls on three areas:

- Strengthening policy and institutional frameworks for low-emission, climate-resilient development;
- Mobilising and expanding financing options and helping to establish supportive policy and regulatory frameworks, and removing barriers to market access;
- Developing effective approaches for scaling up energy service delivery, through field-proven and innovative business models that are financially and institutionally sustainable.

The aim is to achieve universal energy access and expand access to modern energy services which boost income-generating activities and protect human health and the environment. The challenge is to make it happen at sufficient scale and speed to achieve the MDGs by 2015.

Since 1992, UNDP has supported about 3,000 energy projects with a combined value of more than US$4 billion (including co-financing). Examples of these collaborative interventions are given in the following paragraphs:

- In the Philippines, the Department of Energy worked to remove market, policy, technical, and financial barriers to renewable energy through a combination of strategies. These included strengthening the capacity of government agencies to enact and implement supportive renewable energy policies and standards, and providing financing mechanisms and incentives for renewable energy in remote, off-grid communities.
- In Chile, a Global Environment Facility (GEF) initiative set out to remove barriers to the use of non-conventional renewable energies. A set of activities is designed to allow for a decrease in the greenhouse gas emissions produced by energy sources in rural areas. By means of co-funding, more than 10,000 households will be supplied with electricity.
- In Tanzania and in the Dominican Republic, GEF support for community-led initiatives promoting solar photovoltaic technology has helped to shape policies and financing for rural electrification.

UNDP consistently adheres to its core development principles and maintains a focus on the MDGs, ensuring that its assistance directly benefits everyone, including the poor. Interventions on low-emission, climate-resilient development strategies are in line with national priorities. The emphasis is on making cost-effective use of available funds by pursuing interventions that are transformational, and catalysing market-based initiatives to achieve the scale of activity needed to make effective, measurable and lasting improvements. In addition, capacity development and attention to gender are priorities across all projects and activities.

CONCLUSIONS

Achieving universal access to sustainable energy is an ambitious endeavour, but it is achievable. There are no fundamental technical barriers, and it is within reach financially. Experience shows that rapid progress in scaling up programmes and expanding the rate of energy access is indeed possible.

The International Energy Agency's *World Energy Outlook* 2010 estimates that an additional investment of US$756 billion (US$36 billion per year) would be required to achieve the target of universal access to modern energy services by 2030. This is less than 3 per cent of projected global energy investments.

“Providing sustainable energy services for all requires co-ordination and collaboration with all development partners.”

Providing sustainable energy services for all requires co-ordination and collaboration with all development partners. National governments, local authorities, private entities, civil society organisations and communities all have important roles to play. In addition, South-South co-operation will be increasingly vital, as countries share relevant expertise, experience, and good practices.

There is a need for greater co-ordination of poverty reduction, energy access, sustainable energy and climate change initiatives. Access to clean energy is critical, not only to provide hope and opportunities for those who currently have no electricity, efficient fuels or modern technologies, but also because it has an important part to play in creating a low carbon development future for all.

Helen Clark became the Administrator of the United Nations Development Programme in April 2009, and is the first woman to lead the organisation. She is also the Chair of the United Nations Development Group, a committee consisting of the heads of all UN funds, programmes and departments working on development issues. Before her appointment with UNDP, Helen Clark served for nine years as Prime Minister of New Zealand, serving three successive terms from 1999-2008.

The **United Nations Development Programme** (UNDP) is the UN's global development network, advocating for change and connecting countries to knowledge, experience and resources to help people build a better life.

United Nations Development Programme
One United Nations Plaza, New York, NY 10017 USA
Tel: +1 212 906 5000 | Web: www.beta.undp.org

EXHALEENERGY.COM

As Zorlu Energy Group, we have launched an activity that will supply energy for schools.
Click www.exhaleenergy.com and
support this wind movement to brighten the future of children.

ZORLU | www.zorluenerji.com.tr

ZORLU ENERGY GROUP

Alternative energies like wave power are now being explored.

Realising the promise of renewable energy

By **Adnan Z. Amin**, Director-General, International Agency for Renewable Energy (IRENA)

By embracing renewable energies the world can produce the power it needs to develop sustainably. It can assist developing countries, lift isolated communities out of poverty, create jobs and tackle the problems of energy security, climate change and energy access. Current technologies are rapidly advancing, new innovations are in the pipeline, investment is growing and uptake is increasing. Yet the world is still only slowly recognising the full potential of renewable energy. The author asks why and suggests what must be done.

These are exciting times for renewable energy. Investment in the clean energy industry is growing faster than ever before. Developing countries are increasingly viewing renewable energy as a means to raise their standards of living and meet their fast-growing energy needs. At the same time, many developed countries are realising the potential of the green economy to assist their economic situation, while improving their environmental position. Harnessing these opportunities and placing the world on the path to sustainable, clean energy is a key challenge for the International Agency for Renewable Energy (IRENA).

UNTAPPED POTENTIAL

Each renewable energy industry is at a different stage of development in terms of market, technology and efficiency of energy production. Recognised and mature industries include onshore wind energy, hydropower and geothermal. The solar energy industry is well established in some markets but the recent advancements in efficient and cost effective technology are opening up new possibilities. Bioenergy is another industry that has long had a strong presence. The development of second and third generation bioenergy sources is reducing the food vs fuel concerns and creating the potential for wider utilisation. Recent developments have also been announced in relation to marine renewables, with tidal and wave projects moving closer to becoming commercial realities.

> **“Each renewable energy industry is at a different stage of development in terms of market, technology and efficiency of energy production.”**

As well as these commonly recognised technologies, there are numerous ideas under development for new and more efficient technology. Scientists at Penn State University are developing ‘microbial fuel cells’ that promise to harness electricity generated by bacteria. A joint venture between Abu Dhabi’s leading future energy company, Masdar, and SENER, the leading Spanish engineering and technology group, has developed and built a project known

as Gemasolar. This is the world's first commercial scale Concentrating Solar Power (CSP) plant featuring a central tower receiver and molten salt storage system technology. Several other companies are working on ways to use CSP to derive liquid fuel from carbon dioxide in the air.

Many promising forms of renewable energy have developed rapidly in recent years, due largely to an influx of public and private investment. In 2010, investment in renewable energy reached a record US$211 billion – about one-third more than the US$160 billion invested in 2009, and more than five times the amount invested in 2004. Wind farm development in China and small-scale solar PV installation on rooftops in Europe, the expansion of offshore wind finance and record levels of global research and development spending on clean energy technology were the main drivers behind this increase.

But despite these promising trends, daunting challenges lie ahead. Global energy demand is rapidly expanding and oil, coal and gas are still the biggest contributors to the global energy mix. This situation cannot continue if we are serious about global sustainability of both the environment and human development.

MEETING INCREASED NEEDS

Can renewable energy meet our vast and increasing energy needs? There are many sceptics with many arguments, but if, as a global society, we are going to achieve the standard of human and economic development that we desire, we must innovate the solutions to create sustainable, clean energy.

"Bioenergy produced from algae is opening the possibility of biofuel without creating more pressure on scarce food resources."

Already there are a multitude of innovative examples that are enhancing our ability to meet our energy needs through renewable sources. For example, energy storage technologies are improving dramatically and bioenergy produced from algae is opening the possibility of biofuel without creating more pressure on scarce food resources. Given the power of human ingenuity, and an enabling environment, many other ingenious solutions might be just around the corner. Even without these developments, as much as 80 per cent of the world's energy supply could come from renewable energy by 2050 if governments adopt policies to accelerate deployment, according to a recent report by the Intergovernmental Panel on Climate Change.

Renewable energy can also reduce energy costs. Most renewable energy technologies are still immature, and the costs of production and generation are predicted to fall over time. The established understanding that new energy sources take many years to become cost effective does not necessarily apply to renewable energy. The relative simplicity of renewable energy technologies has put the industry well within the investment scope of developing countries. In many areas the developing world is leading the charge: US$51 billion of the global US$234 billion invested in new clean energy projects in 2010 was spent in China. Also, according to the REN21 *Global Status Report 2011*, "Of the 119 countries that now have renewable energy policy targets or support policies, at least half are in the developing world."

POWER FOR THE POOREST

The 'modular' nature of renewable energy sources, and their frequent ability to operate without infrastructure, can make them particularly effective in the developing world. Telecommunications shares a similar system – large projects require large structural investment, whereas more modular projects involve little infrastructure. In many developing countries the lack of infrastructure required to run mobile

RWANDA: 'ENERGY KIOSKS' IN RURAL AREAS

In Rwanda, a project established by students from London's Imperial College has developed a new way of delivering solar power to rural communities – without the need for high up-front investment and costly infrastructure. The innovative 'e.quinox' system uses small solar charging stations called 'energy kiosks'. The kiosks charge batteries that can be hired for a small fee, which can be used for small-scale operations such as lighting or phone charging. When the batteries run down, the users return them to their nearest kiosk for solar recharging. Here again, the modular nature of renewable energy avoids the need for large-scale – or even small-scale – infrastructural investment and places power directly in the hands of the people. The system is currently being considered for nationwide implementation by the Rwandan government. The success of small enterprises like this shows that, when it comes to renewable energy, progress can be made without the help of governments or large private investments.

GERMANY: INCREASING THE RENEWABLE PROPORTION

In the case of renewable energy utilisation in the developed world, Germany is proving to be a leader in the field. Germany now derives more than 20 per cent of its electricity from renewable sources – a 15 per cent increase since 2000. In the last year alone, Germany's share of renewable electricity has grown from 18.3 to 20.8 per cent. Due to the German Government and Chancellor Angela Merkel's commitment to shelving nuclear power after Fukushima, the country is planning to dramatically increase the proportion of renewable energy within its energy mix. Germany's success in rolling out renewable energy can be firmly attributed to a range of sound policy initiatives. In particular, the German Renewable Energy Act is giving renewable energy investors and manufacturers an assured market in which to develop.

communications has meant that telecommunications has by-passed the need for landline providers. A similar model is already being exploited by renewable energy and there is plenty of scope for expansion.

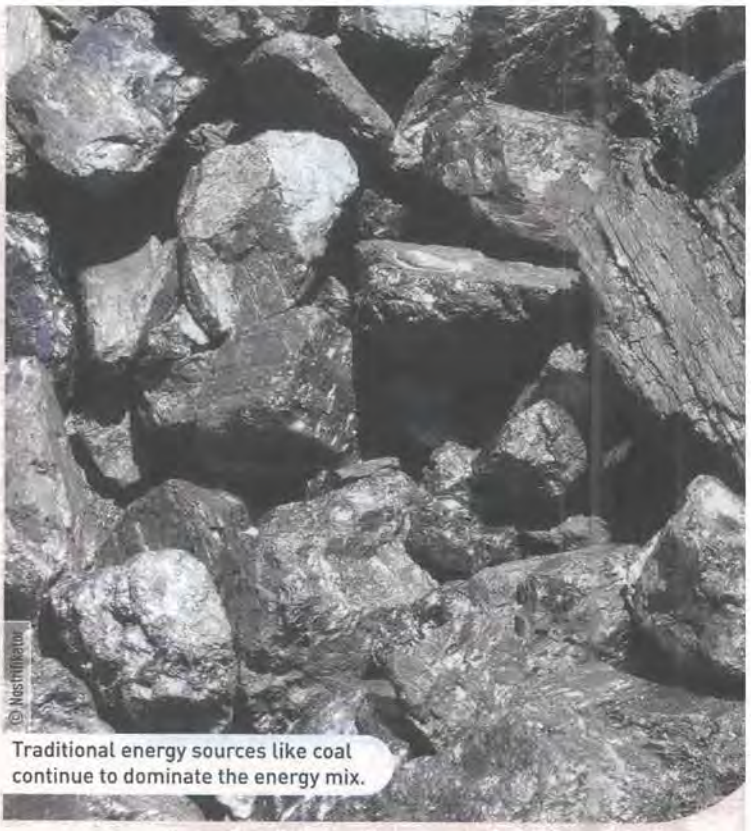
A global green energy revolution could be the turning point that many economists say is needed to drag western economies from the brink of a long-term recession. Renewable energy is a source of diversified economic growth and job creation. The REN21 *Global Status Report* states that worldwide jobs in renewable energy industries exceeded 3.5 million in 2010.

LEVELLING THE PLAYING FIELD

So why – given these myriad advantages – is renewable energy still so far from meeting its potential?

There are a number of reasons. One is the current global political and economic situation, where the energy market is distorted to benefit existing energy providers. Conventional energy sources are still holding a privileged position throughout the world, with energy laws expressly tailored towards them. They also receive vast amounts of financial support, receiving between US$300 and 500 billion worth of government subsidies annually, which constitutes an unprecedented level of energy market distortion. Other reasons include insufficient technical or administrative know-how, and a general dearth of information concerning the potential of renewable energy to meet global energy needs.

This is where IRENA comes in – to help renewable energy realise its enormous potential by breaking down the many political, economic and institutional barriers that hold it back.



Traditional energy sources like coal continue to dominate the energy mix.

while preventing catastrophic climate change. Despite the current difficulties besetting international discussion on these matters, the message that IRENA brings to the global community is that we have the knowledge to provide effective solutions, the technology to transform our energy to sustainable sources and, with the establishment of IRENA, an international platform that can bring together stakeholders to create a sustainable and clean energy future.

“Conventional energy sources are still holding a privileged position throughout the world.”

IRENA's policy advisory services and capacity building sub-programme has been designed to encourage an 'enabling environment' for renewable energy. There are a variety of examples of policies that can bring about this enabling environment. Some of the most common examples include: incentives for R&D; renewable energy quotas; favourable tax policies; rebates and grants; and funds designed to assist renewable energy projects access funding. This sub-programme works with two others: the knowledge management and technology sub-programme, which is designed to facilitate an increased role for renewable energy; and also the innovation and technology sub-programme, which works to create a framework for technology support, cost reduction potentials and the wider use of standards.

Together these three programmes are contributing to the worldwide acceleration of renewable energy adoption. Renewable energy is one of our few hopes for tackling perhaps the biggest challenge humanity has ever faced: ensuring continuing energy security, and providing energy access to millions of those still deprived of it,

Adnan Z. Amin was appointed as the first Director-General of the International Renewable Energy Agency (IRENA) in April 2011. In this capacity, he is charged with the responsibility of leading and managing the Agency in the implementation of its mandate to promote the adoption and use of renewable energy worldwide.

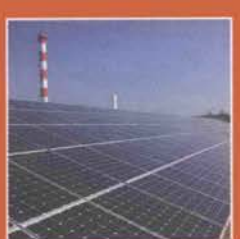
The **International Renewable Energy Agency** (IRENA), founded in 2009, is headquartered in Abu Dhabi where its first Assembly was held in April 2011. With the participation of 148 countries and the EU and 84 Members and the EU, IRENA has become a nexus of international efforts to accelerate the deployment of renewable energy technologies. IRENA is an intergovernmental organisation that provides an inclusive platform where stakeholders contribute to common goals through global, regional, and national co-operation, knowledge sharing, enabling policies, enhanced capacity, investment encouragement and strengthened technology and innovation.

IRENA Headquarters
C 67 Office Building, Khalidiyah (32nd) Street, PO Box 236
Abu Dhabi (UAE)

IRENA Innovation Technology Centre
Robert-Schuman-Platz 3, 53175 Bonn, Germany
Tel: +971 (0)241 79062 | Email: irenapress@irena.org
Web: www.irena.org

“WE HAVE NEWS”

(Good news)



Energy, climate, the markets: in today's threatening world, bad news are piling up.

But, at Solairedirect, we deliver some really good news regarding solar energy, global warming, green jobs...

The challenge for solar power is to overcome its dependence on subsidies and to become competitive with other energy sources.

We are proud to be one of the very first companies in the world to generate and supply solar power without relying on incentives, thanks to radically lower system costs, innovative financing and smart grid interfaces.

We also empower communities and municipalities through public private partnerships helping them to generate their own power and to strive towards the goal of 100% clean energy.

Our first such joint venture was recently signed with Poitou-Charentes, one of France's regions, and will supply over 100.000 residents with home grown, clean solar power. Soon, other communities will follow in South Africa, India, Chile and other countries.

Sometimes, after all, today's news can make you feel optimistic.

solairedirect

The Solar MWh Company

www.solairedirect**.com**

Sustainability from the farm to the table

BRF is one of the largest food companies in the world. Our vision is that to be truly sustainable, we need to bring with us the entire value chain – which in our case involves thousands of producers of grain, poultry, pork and beef, in addition to a range of different suppliers. A good example of this is the Sustainable Hog Culture Program, established to reduce the impacts of greenhouse gas (GHG) emissions, as well as to arouse the environmental awareness of our rural producers.

Today, BRF has more than 3,500 pork producers, most of them small farmers. The project consists of installing biodigesters on the farms where the animal waste is produced. The methane gas generated – which is 21 times more polluting than CO_2 – is captured, and the waste transformed at the end of the process into a high quality biofertiliser. A quantity of biogas is also produced, which may be used for heating and power generation.

The programme was framed in the form of a Clean Development Mechanism (CDM) project, and thus generates carbon credits. The whole process of registration, validation and commercialisation of these credits is carried out by BRF, but the entire revenue from the sale of them is returned to farmers.

THE CHALLENGES

The first challenge was to convince the producers to become involved in the project. The vast majority had never heard anything about the Kyoto Protocol, and even less about the CDM or carbon credits. Earlier, some had doubts about the benefits of installing the digester, which requires investment from farmers and finance from the company. Gradually the message spread about the advantages of the project, and participation by the producers has exceeded our expectations. Currently, more than 1,300 farms are committed to the programme, representing a reduction in emissions of about 140,000 tonnes of CO_2.


© Guilherme Dalmazo


© Archive BRF

A second challenge was that we had to develop the appropriate technology from scratch. There were no digesters that met our needs, and no effective mechanisms to measure the amount of gas captured. BRF sought partners and together we developed the necessary equipment.

Another difficulty has been a change in the methodology of the Clean Developmental Mechanism, which has made projects more expensive than expected and reduced the amount of gas to be captured.

Changes in criteria and the costs of external audit are just some of the challenges faced by companies that have followed this path. These difficulties are even greater in the local business context. One of the aims of the programme was to give small producers access to the carbon market; this would be virtually impossible without the support of the company.

Through this programme, we offer the opportunity for our pork producers to gain alternative sources of income, as well as making substantial reductions in emissions. Many producers already sell the biofertiliser. Others gain by the use of biogas for energy generation in their properties.

In addition, all resources from the sale of carbon credits should be compulsorily invested in the sustainability of farms.

With this programme we are taking an important step to encourage the concept of sustainability in food production, which is the foundation of our business and an important economic sector in Brazil where our company is headquartered. We hope that our model becomes an example to others in the industry, demonstrating that our country can increase production in a cleaner way.

Kristhian Kaminski, Communication Manager, BRF
Rua Hungria, 1400 – Jardim Europa, São Paulo, Brazil
Tel: +55 11 2322 5062 | Email: Kristhian.kaminski@brasilfoods.com
Web: www.brasilfoods.com

Blind spots and converging agendas: climate and food security

By **Dr José Graziano da Silva**, Director-General Elect, UN Food and Agriculture Organization (FAO)

With the tendency towards ever-increasing specialisation, it is becoming easier to be blind to situations in which the actions that are taken within one subject area could converge with those being applied by other people working on seemingly different subjects. Because of this blind spot, we are quite likely even to end up acting in opposition to those with whom we should collaborate, especially if we see ourselves as competing with them for scarce resources or for political attention. The tendency to concentrate on quite narrow goals, combined with a widespread failure to identify possible areas of convergence between different initiatives, could perhaps be one of the causes for the disappointing performance of many programmes and projects. With this in mind, it is instructive to look at Brazil's Zero Hunger programme and consider its relevance to approaches towards meeting future food needs, improving human health, preventing the degradation of natural resources and slowing down the processes of climate change.

© UNesert

The Zero hunger programme in Brazil has been extremely effective. An expanded school meals programme and regular health checks are part of the programme.

THE ZERO HUNGER PROGRAMME

When President Lula da Silva launched Brazil's Zero Hunger programme in January 2003, many people claimed that it was fiscally unaffordable, that welfare would compete for funds better applied to development, that it would fuel inflation, and that it would increase the dependency of the poor on 'handouts'.

> **"The programme is stimulating economic growth where it is most needed, in the poorest communities."**

Their blind spot prevented them from being able to see that emancipating the poor from hunger and resultant social exclusion would, besides guaranteeing their human right to food, actually open the way for development; and that there was, in fact, a convergence between the hunger reduction and the economic development agendas.

The idea that better nutrition can accelerate economic growth is not a new one. The Nobel Prize-winning economist Robert William Fogel claimed in *The Escape from Hunger and Premature Death* (2004) that "the combined effect of the increase in dietary energy available for work, and of the increased human efficiency in transforming dietary energy into work output, appears to account for about 50 per cent of the British economic growth since 1790."

The largest component of Zero Hunger and the one which drew most criticism is its conditional cash transfer programme, currently known as Bolsa Familia. It provides over 12 million poor families with modest monthly grants, that enable them to meet their basic food needs. Funds are transferred by electronic card, wherever possible to an adult woman in the recipient family. Beneficiaries are required to keep their children in school and to have regular health checks.

Eight years on, it is clear that the transfers are generating high returns in terms of better health, lower child mortality, less stunting, and higher levels of participation in the labour market. The programme is stimulating economic growth where it is most needed, in the poorest communities; the wide income gap between rich and poor is shrinking, and there have been massive reductions in the number of people living in poverty and extreme poverty.

Moreover, through these grants and expanded school meals programmes, Zero Hunger is translating the food needs of the poor into incremental demand which, in turn, induces growth in food production by small-scale farmers. For many participants, Bolsa Familia represents a modern-day form of emancipation, not from slavery but from dependence on water-lords, landlords and money-lenders.

© Lars Plougmann

Unsustainable forms of agriculture are not accounted for in GDP and will be paid for in the future, through loss of biodiversity and damage to soils and the hydrosphere.

The experience shows that, contrary to the views of the prophets of doom, who included many distinguished economists, hunger reduction and economic growth are mutually reinforcing processes with convergent agendas. The Brazilian entrepreneur Eliane Belfort, commenting on estimates that US$1 spent on Bolsa Familia led to a growth in Brazilian GDP of US$22 in 2005-06, claims that such social protection programmes boost the economy and strengthen internal markets, and that "to invest in the quality of workers' lives is an investment in business competitiveness" (*Desenvolvimento Social*, March 2010).

THREE ISSUES IN ISOLATION

If we turn our attention to the issues of meeting future global food needs, the conservation of natural resources, and climate change mitigation, we shall see a rather similar picture. Each issue seems to have been pursued largely in isolation from the other.

Thus, at least until quite recently, it has been taken for granted that the world's expanding food needs could only be met by the intensification of agriculture, using the input-intensive technologies applied in industrialised countries after the Second World War and subsequently promoted in developing countries through the 'green revolution'.

The need to end hunger was trumpeted as the justification for the genetic modification of crops and livestock as well as for mono-cropping and ever-increasing scales of farming, underpinned by greater mechanisation, higher rates of fertiliser application and the use of pesticides. In order to justify the further expansion of such approaches to agricultural growth (which generate huge benefits for the handful of corporations that dominate the farm input and food commodities trade), a blind eye was conveniently turned to the environmental costs of the damage to soils, water resources and biodiversity caused by these systems, with the result that we are effectively leaving it to future generations to pay for it.

These costs are not accounted for in estimates of GDP, nor are they factored into food prices. Yet, as the recent European Nitrogen Assessment shows, they are massive, with, for example, nitrogen pollution damage, partly from fertilisers and intensive livestock farming, amounting to a staggering €70 billion to €320 billion per year for the whole of Europe.

Technology and innovation are as crucial for agriculture as in other areas, but if our food production is not sustainable we will deplete irreplaceable natural resources and will not manage to eradicate hunger.

> **"Until quite recently, it has been taken for granted that the world's expanding food needs could only be met by the intensification of agriculture."**

It is also important to bear in mind that most input-intensive technology and the proposed solutions to increase productivity are not accessible by farmers in the poor and developing world and, in some cases, may not even be particularly useful either, since they respond to different climatic and geographic conditions.

New technologies can benefit farmers in poor and developing countries if they address their needs, for instance, seeds of varieties that are drought resistant and adaptable to tropical conditions.

The UN Food and Agriculture Organization (FAO)'s forecasts show that, if we continue 'business as usual', the population will rise by 30 per cent but demand for food will grow by 70 per cent by 2050 – and 370 million people will still be chronically hungry! To close the food gap faced by the billion people who are now hungry requires less than 3 per cent of global food production. This means that most of the forecast extra demand is generated by people who shift, as their incomes rise, from traditional diets to the food consumption patterns of Europe and North America. Yet the latter involve widespread over-consumption of food that is resulting in an obesity epidemic, expected to induce an explosion in the future incidence of non-communicable ailments such as cardiovascular diseases and diabetes. And they are also characterised by massive wastage of good food, with the amount of edible food thrown out by households in industrialised countries after its purchase being more or less equivalent to the annual net food consumption of sub-Saharan Africa (FAO, *World Agriculture: towards 2030/2050*, Rome, 2006).

"If our food production is not sustainable we will deplete irreplaceable natural resources and will not manage to eradicate hunger."

There is an emerging consensus that agriculture and the clearing of forest mainly to make room for farming together account for between one-quarter and one-third of all the greenhouse gas emissions that drive the processes of global warming and climate change. The main sources are fossil fuels used by farm machinery and in food transport and processing, as well as in fertiliser manufacture, and methane that is released from flooded paddy fields and intensive livestock systems. Farmers in some regions may benefit from better conditions, but, in general, climate change will play havoc with agriculture, significantly altering crop growth conditions and unleashing more frequent extreme weather events.

CONVERGENT, REINFORCING TECHNIQUES

What is abundantly clear from the above is that to blindly insist on approaching the expansion of food production, consumption and wastage, following conventional systems, is a recipe for future disaster. This course will amplify the already serious degradation of natural resources, create huge human health problems and accelerate the processes of climate change, making it increasingly difficult to meet future food needs.

Instead, humankind must explore ways in which the pursuit of the goals of increased food production, better human health, environmental conservation and a slowing down of climate change processes can converge and be mutually reinforcing. Briefly, from the agricultural and food security perspectives, the following actions could maximise the extent to which food production and consumption contribute to the attainment of health, environmental and climate change goals.

Food production:

- Promote a shift to sustainable intensive farming systems (FAO, *Save and Grow*, 2011): systems that use much less energy, build up soil organic matter (sequestering carbon, raising fertility and enhancing water infiltration and retention), improve water use efficiency, engage in biological nitrogen fixation and integrated pest management;
- Recover degraded land to increase production without advancing into new areas;
- Support sustainable small-scale production in poor and developing countries to supply local markets.

Food consumption and nutrition:

- Encourage widespread adoption of a good mixed diet in order to bring down the average level of food intake in over-consuming countries;
- Provide targeted social protection grants to enable poor families to meet their nutritional needs.

Food wastage:

- Discourage wastage by food and nutrition education programmes.

Shifts in the ways in which food is produced, consumed and wasted can contribute importantly to the achievement of global and national health, environmental and climate change objectives and should be encouraged by incentives related to the achievement of the latter.

José Graziano da Silva, Ph.D, is the Director-General Elect of FAO. He will take up office on January 1, 2012. Graziano da Silva has had a distinguished career in the fields of food security, agriculture and rural development, and led the design and initial implementation of the Zero Hunger programme in Brazil. Since 2006, he has served as FAO Regional Representative for Latin America and the Caribbean.

The **Food and Agriculture Organization of the United Nations** (FAO) has the mandate to raise levels of nutrition, improve agricultural productivity, better the lives of rural populations and contribute to the growth of the world economy. Achieving food security for all is at the heart of FAO's efforts – to make sure people have regular access to enough high-quality food to lead active, healthy lives.

Viale delle Terme di Caracalla
00153 Rome, Italy
Tel: +39 06 57051 | Fax: +39 06 570 53152
Email: fao-hq@fao.org | Web: www.fao.org

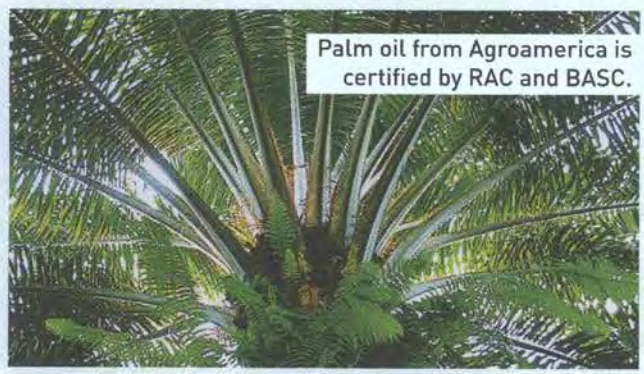
AgroAmerica

Agroamerica's contribution to sustainable development

Agroamerica supports a green economy in the context of poverty alleviation, sustainable development and the preservation of natural resources, and contributes to the achievement of the Millennium Development Goals (MDGs).

Agroamerica is one of the most important agribusinesses in Central America and around the world. It has operations in Guatemala, Costa Rica, and Panama, with thousands of employees who make the process of economic development possible.

Agroamerica's main business areas are focused on the production and exportation of bananas and pineapples, utilising our own transportation and logistics services, and in the production and processing of palm oil.



Palm oil from Agroamerica is certified by RAC and BASC.

MINIMISING NEGATIVE IMPACTS

The scarcity of natural resources has encouraged our industry to design innovative ways of increasing production while minimising negative environmental impact. Some of our projects that achieve this are:

- **Precision agriculture and water efficiency.** We have invested in the latest technology for precision agriculture for our plantations, thus reducing water usage and costs by 20 per cent while maintaining record yields.
- **Carbon capture and clean energy.** We are the first Guatemalan palm oil company to have a project registered under the Clean Development Mechanism of the Kyoto Protocol and Carbon Emission Reduction issuance in the region. We capture over 30,000 tonnes of carbon dioxide per year and use biogas generators to produce 5MW/hr of clean energy for sale to the national electric grid. Our goal is to become carbon neutral in our banana operations, and achieve net carbon sequestration in our palm oil operations.
- **Recycling.** We have reduced costs per box by 7 per cent, and plastic bag usage by 66 per cent, implementing the use of environmentally friendly materials.

ENSURING OUR COMMITMENT

Agroamerica is certified by **Global Gap** and are members of the **Roundtable on Sustainable Palm Oil (RSPO).**

GLOBALG.A.P.

RSPO

Roundtable on Sustainable Palm Oil

Agroamerica is the first palm oil company in the world to receive global certification from the following organisations:

Rainforest Alliance Certified

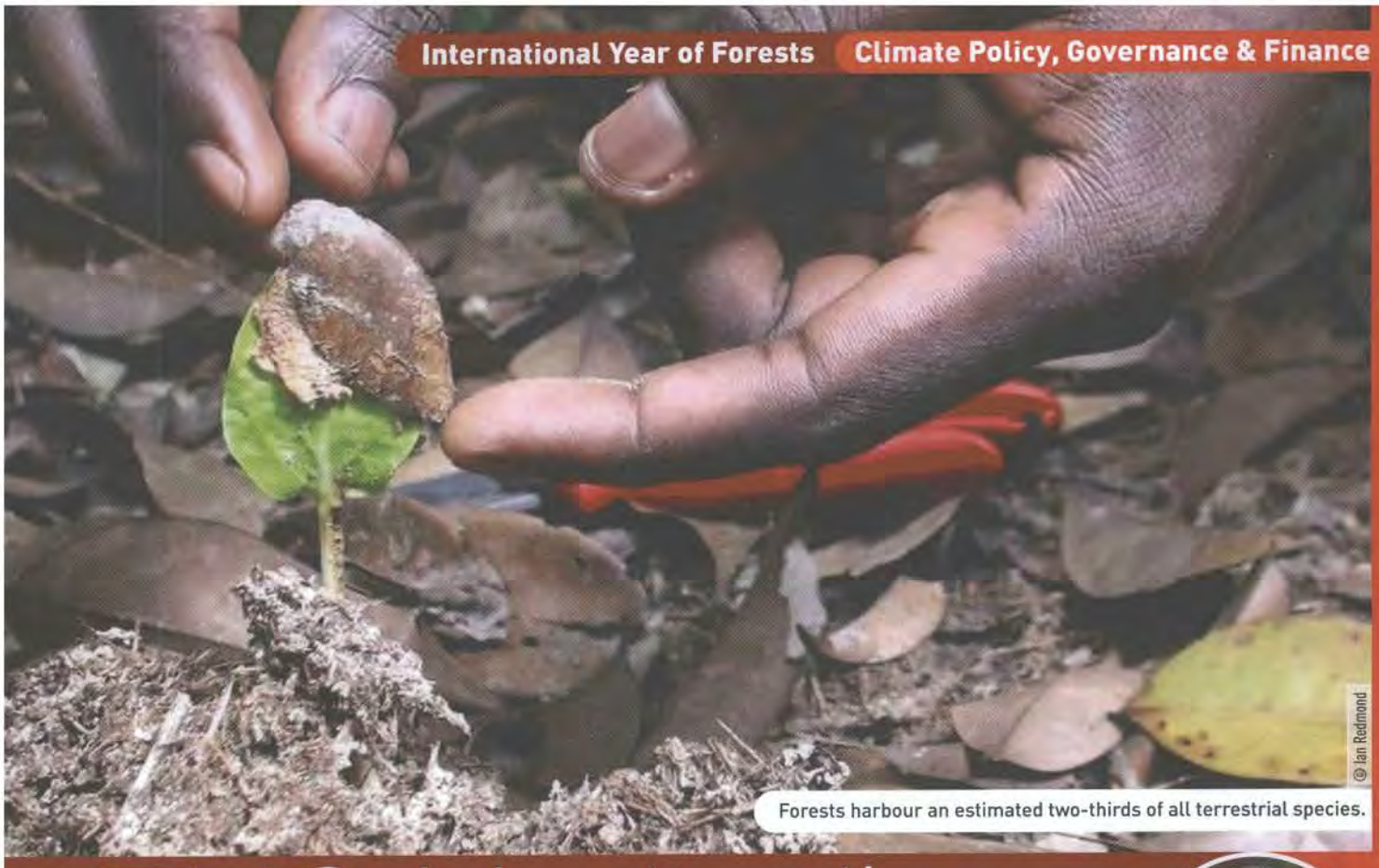
BASC (Business Alliance for Secure Commerce)

Agroamerica has implemented social programmes in alliance with local governments, NGOs, universities and community leaders to help to achieve the Millennium Development Goals of environmental sustainability, poverty and hunger eradication, universal education, and child and maternal health. One of these programmes, called Better Families, focuses on improving the health and nutrition of women and children. Currently we have 750 mothers participating and more than 880 children monitored in 10 rural villages.

Agroamerica has become the first company nationwide to sign up as a Living Wage Employer to promote the well-being of the families and the personnel of its banana and palm oil plantations.

The use of the latest technology has reduced water use by 20%.

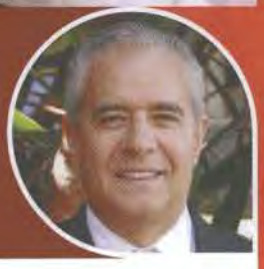
Avenida Las Américas, 22-83 Zona 14 Edificio Agroamérica
Guatemala
Tel: +502 2285 4100 | Fax: +502 2285 4150 | www.agroamerica.com



© Ian Redmond

Forests harbour an estimated two-thirds of all terrestrial species.

Celebrating the 2011 International Year of Forests



By **Ahmed Djoghlaf**, Executive Secretary, Convention on Biological Diversity

Forests provide us with an array of biological goods and ecosystem services. However, humans are putting so much pressure on forest systems that their ability to sustain us is in serious jeopardy. The loss of forests is particularly worrying since forest ecosystems are an integral part of climate change mitigation and adaptation strategies. Hence, the Strategic Plan for Biodiversity adopted at the Nagoya Biodiversity Summit in 2010 includes several key targets related to forests. The International Year of Forests has been an important opportunity to lay the groundwork for achieving these targets, but there is still much work to be done beyond 2011.

A VALUABLE BUT DWINDLING RESOURCE

The forests of the world are vast, with thirty percent of the world's land area being forest cover. These forests include not only the expansive tropical forests in Brazil, the heart of Borneo, and the Congo, but also the massive boreal ecosystems of Canada and Russia, as well as numerous dry forests and mangrove forests around the world. Importantly, forests are particularly rich in biodiversity. They harbour an estimated two-thirds of all terrestrial species, as well as a wide array of ecological processes. Tropical forests, in particular, are among the most biologically diverse ecosystems on earth.

> **“They harbour an estimated two-thirds of all terrestrial species, as well as a wide array of ecological processes.”**

These forests support communities around the globe. They are estimated to be home to 300 million people with over five times that number – 1.6 billion people – relying on them for their livelihoods. Raw timber products around the globe are worth around US$250 billion dollars, with the added economic value being significantly greater.

In addition, forests are the source of food and medicinal ingredients that make the difference between poverty and well-being for three quarters of the populations of some developing countries. They provide essential environmental services such as conserving soils, ensuring adequate water supply, and regulating the climate. And, in particularly arid parts of the world, forests are crucial sources of sustenance during dry periods.

The loss of forests is particularly worrying.

However, humans are putting so much pressure on the forests of our planet that their ability to nurture and sustain us is in serious jeopardy. For example, the 2008 IUCN Red List shows that nearly one-quarter of assessed mammal species are threatened with extinction, with a high proportion of those species living in forests. Overall, the 2010 Global Forest Resources Assessment shows that although deforestation has slowed somewhat in recent years relative to the 1990s, it is still alarmingly high. Four million hectares (40,000 sq km) of highly diverse primary forests, an area the size of the Netherlands, are lost every year.

PRESERVING FORESTS TO COMBAT CLIMATE CHANGE

The ongoing loss of forests becomes particularly worrying when we consider urgent needs to deal with climate change. For example, forests are a critical part of ecosystem-based adaptation strategies. Conserving intact coastal ecosystems such as mangroves can help reduce the impacts of flooding and storm surges. In addition, the conservation and restoration of forests can help to stabilise land slopes and regulate water flow.

Moreover, reducing deforestation and forest fragmentation can help to mitigate climate change by promoting carbon storage. Deforestation is currently estimated to be responsible for up to 20 per cent of annual human-induced CO_2 emissions, since forests account for as much as 80 per cent of the total above-ground terrestrial carbon. A recent synthesis of more than 400 scientific studies on forest resilience concluded that long-term stability of the forest carbon stock against disturbance rests on forest ecosystem resilience, which is conferred by biodiversity at multiple scales.

Importantly, addressing biodiversity loss and climate change simultaneously can also create new economic opportunities. As reported in the study *The Economics of Ecosystems and Biodiversity* (TEEB), the global carbon market grew from essentially zero in 2004 to over US$140 billion in 2009. At the same time, new markets for biodiversity 'credits' and intangible ecosystem services such as watershed protection are also emerging, offering new environmental assets with both local and international trading opportunities. For example, the global market size for bio-carbon and forest offsets is expected to grow from US$21 million in 2006 to over US$10 billion in 2020, while the sales of certified 'sustainable' forest products quadrupled between 2005 and 2007. Overall, avoiding greenhouse gas emissions by conserving forests is estimated to have a net present value of US$3.7 trillion.

On the other side, failing to protect sufficiently large areas of intact forests could push certain forest ecosystems past tipping points into feedback loops of self-perpetuating degradation. This would further contribute to increased global temperature and biodiversity loss, resulting in substantial economic losses and negative effects on human livelihoods and well-being.

THE AICHI BIODIVERSITY TARGETS

All this concern led the United Nations to declare 2011 the International Year of Forests. Importantly, this year's celebrations come on the heels of the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity, held in Nagoya, Japan. There, our 193 parties adopted the Strategic Plan Biodiversity 2011-2020, also known as the Aichi Biodiversity Targets. Several of these targets are directly relevant to forests:

- Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation are significantly reduced.
- Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
- Target 11: By 2020, at least 17 per cent of terrestrial and inland water and 10 per cent of coastal and marine areas are conserved.
- Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

“Avoiding greenhouse gas emissions by conserving forests is estimated to have a net present value of US$3.7 trillion.”

In addition, two other targets indirectly relate to forests. Target 3 is to eliminate negative incentives harmful to biodiversity, and apply positive incentives for conservation and sustainable use. Target 14 is to restore and safeguard ecosystems that provide essential services and contribute to health, livelihoods and well-being, in particular of women, indigenous and local communities, and the poor and vulnerable.

BUILDING ON THE SUCCESSES OF NAGOYA

Following the adoption of the Aichi Targets, the Secretariat of the Convention on Biological Diversity (CBD) has renewed its forest-related activities in three key ways. First, based on a Memorandum of Understanding and with generous funding from the Government of Japan, the International Tropical Timber Organization (ITTO) and the CBD have started a joint initiative for the conservation and sustainable use of tropical forest biodiversity. The initiative supports the implementation of the CBD programme of work on forest biodiversity in ITTO producer member countries through specific country projects related to capacity building, technical support and guidance. Among other things, these projects focus on the linkages between forest biodiversity and climate change, biodiversity conservation in production forests, and transboundary conservation of tropical forest resources. The focus on transboundary conservation, in particular, may present new opportunities for existing or future World Heritage sites in tropical forests.

Second, the CBD is moving forward with its LifeWeb Initiative, which facilitates financing for protected areas to conserve biodiversity, address climate change and secure livelihoods. Since 2009, 16 donor partners have provided over US$120 million in funding support for projects profiled through the LifeWeb clearing-house. Much of this support has been for conservation and restoration of forest areas. Over 35 countries are currently profiling further priorities and partnerships are being sought for an additional US$720 million.

Third, the Secretariat is collaborating with its partners to hold a series of regional consultation and capacity-building workshops on REDD+ (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries). The workshops are soliciting advice from our Parties on REDD+ and relevant biodiversity safeguards, on possible indicators to assess the contribution of REDD+ to achieving the objectives of the CBD, and on potential mechanisms to monitor the impacts of REDD+ on biodiversity. They are also contributing to capacity building on REDD+. The results are intended to support both the CBD and UNFCCC discussions on safeguards, as well as on the monitoring of biodiversity in the context of the forest-related components of the Aichi Targets.

MOVING BEYOND 2011

Overall, things are on the move when it comes to preserving forests. However, the goals we have set will be achieved only through constant labour, which is why the UN General Assembly declared 2011-2020 the UN Decade on Biodiversity. While the International Year of Forests has been the first phase of this ten-year celebration of life on Earth, it will be important to continue making progress throughout the decade.

Over the next ten years, the preservation of biodiversity in all its forms must be mainstreamed throughout government and all sectors of society through communication, education and awareness-raising, appropriate incentive measures, and institutional change. By 2020, citizens and governments without exception should be firmly committed to the preservation of our biological heritage.

To this end, it will be important to continue promoting synergies in addressing biodiversity loss and climate change. And indeed, the CBD, the UNCCD and the UNFCCC are increasingly working together to realise the policy synergy needed for sustainable development. An example is the Rio Conventions' Ecosystems and Climate Change Pavilion, a collaborative outreach activity linking biodiversity, climate change and sustainable land management. The Pavilion serves as a critical partnership platform for raising awareness and sharing information about the latest practices and scientific findings on the co-benefits that can be realised through joint implementation of the three Rio Conventions.

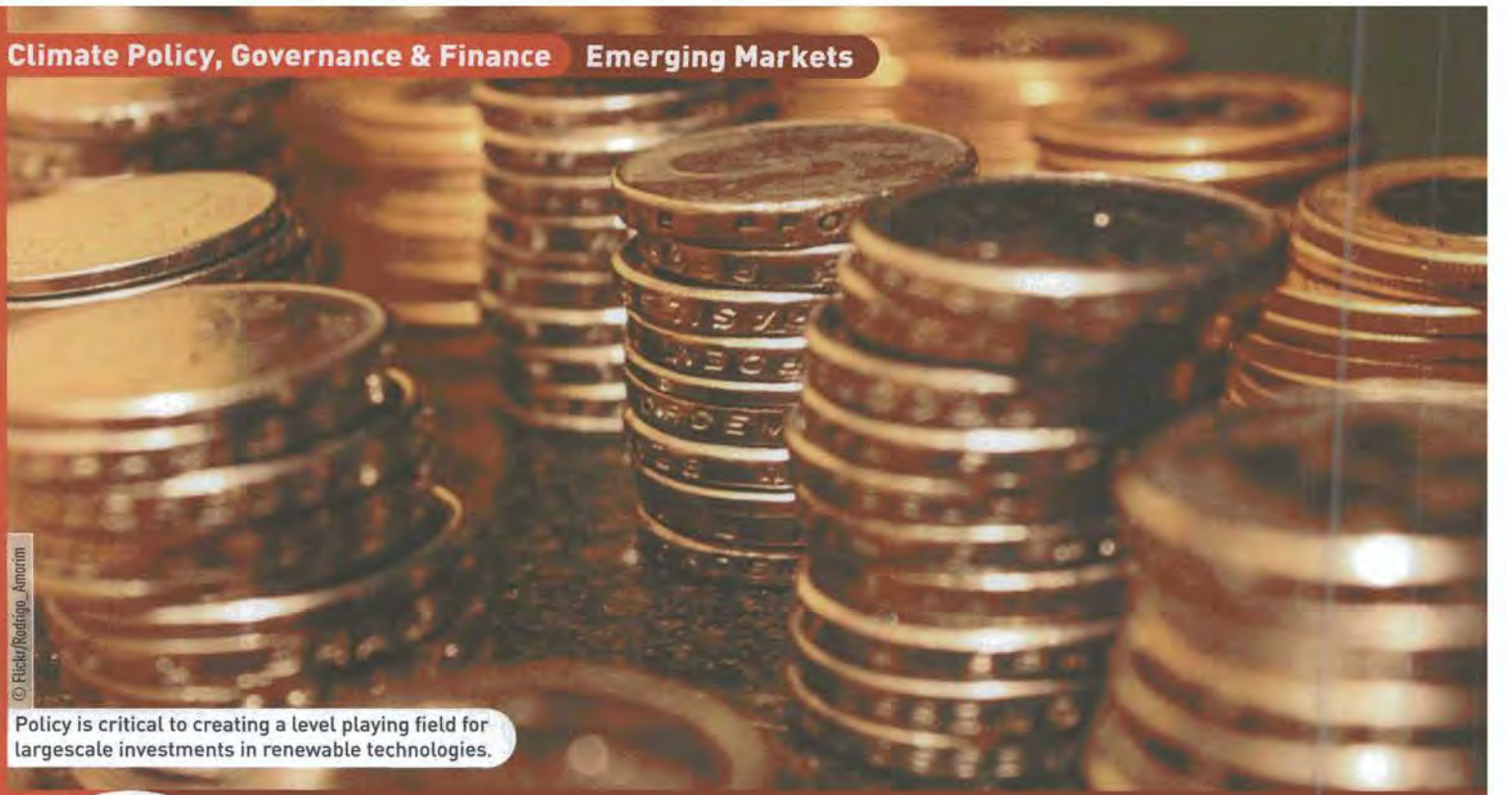
> **“By 2020, citizens and governments should be firmly committed to the preservation of our biological heritage.”**

This is precisely the kind of collaboration we will need if we are to effectively tackle the interrelated problems of biodiversity loss and climate change. The CBD therefore looks forward to continuing to work with current partners, but also to finding new ones. For truly, no one can afford to stand idly by in the fight to save life on Earth, particularly when it comes to the world's most diverse terrestrial ecosystems: forests.

Ahmed Djoghlaf, Ph.D, is Executive Secretary of the Convention on Biological Diversity (CBD). He was formerly Assistant Executive Director of UNEP, and Director and Co-ordinator of UNEP's Division of the Global Environment Facility (GEF). In his earlier career, he was the General Rapporteur of the Preparatory Committee of the UN Conference on Environment and Development (UNCED), better known as the Rio Summit. His numerous positions at the CBD included Acting Principal Officer on intergovernmental issues and co-operative arrangements at the Secretariat. Prior to joining the United Nations, Dr Djoghlaf held a variety of important posts in the Algerian Ministry of Foreign Affairs.

The **UN Convention on Biological Diversity** (CBD) entered into force on December 29th, 1993. It has three main objectives: the conservation of biological diversity; the sustainable use of the components of biological diversity; and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

UNEP/Secretariat of the Convention on Biological Diversity
413 St-Jacques, World Trade Centre, 8th Floor, Suite 800
Montreal, H2Y 1N9, Canada
Tel: +1 514 287 7002 | Fax: +1 514 288 6588
Email: secretariat@cbd.int | Web: www.cbd.int



© Flickr/Rodrigo_Amorim

Policy is critical to creating a level playing field for largescale investments in renewable technologies.

Financing climate change investments in the developing world

By **Stephanie Pfeifer**, Executive Director, Institutional Investors Group on Climate Change (IIGCC)

Much debate in the developed world, particularly in Europe, and most recently in Australia, has focused on the need for stable policy and well-structured mechanisms to stimulate private investment into low-carbon and renewable technologies. There has been less focus on the conditions necessary to enable the private sector to line up behind funding such investments in the developing world. This, of course, is crucial for many developing market economies, some in places where the impacts of climate change will be felt more strongly than in many developed countries.

Policy is critical to creating a level playing field for large-scale investments in renewable technologies, infrastructure and utilities. Investors will consider the risk-return characteristics of any given investment and evaluate them against other investment opportunities. Uncertainty, lack of clarity and, worst of all, retroactive policy, are all significant barriers to private sector investment. The importance of credible regulatory frameworks and low-carbon domestic policies for attracting substantial investment applies to both developed and developing markets; and although progress is being made, there is still a long way to go before these conditions are met.

The good news is that there are clear signs that when an appropriate policy infrastructure is put in place, investors commit capital. In some emerging economies, however, investors will face additional challenges which make an accurate risk-return assessment difficult. These extra risk factors could include limited transparency, strong third party dependency, higher transaction costs, low liquidity, fewer possibilities to re-use competences, and greater financial and political uncertainty. Most of these risks are not specific to climate change investments. High perceived risks translate into higher return expectations. Therefore, reform that reduces these risks is necessary before investors can commit at scale to funding climate change solutions.

> **“Uncertainty, lack of clarity and, worst of all, retroactive policy, are all significant barriers to private sector investment.”**

PROGRESS IN EMERGING MARKETS

There are promising developments in some emerging market countries. For example, in June 2008 the Indian government revealed its ‘National Action Plan on Climate Change’, the country’s first attempt to tackle climate change in a strategic manner. Eight ‘missions’ were established, including for solar energy, energy efficiency and improved knowledge of climate


Investment in renewables in India in 2010 increased by 25%.

© Flickr/Warrenski

change. Since then the country has set a series of low carbon policy targets which include the reducing of carbon dioxide emissions per unit of GDP by 20-25 per cent from 2005 to 2020 and increasing the proportion of electricity from renewables to 15 per cent by 2020.

Stricter building standards for lighting, heating, ventilation and air conditioning have also been set and demand side management initiatives promoted. The evidence so far suggests that there has been some success in India, with investment in renewables growing by 25 per cent in 2010 alone. While this indicates what can be achieved when credible and comprehensive climate change solutions are put in place, it is too early to judge the likely long-term impact of these changes.

Investors will necessarily be cautious while policy frameworks are still in the early stages of development, and will need to be convinced that policy commitments are stable – as well as seeing finance continue to flow from domestic and international sources. It is, however, a promising start.

> **“High perceived risks translate into higher return expectations.”**

Another country taking positive steps on climate change policy is South Africa. The South African government last year announced the South African Renewables Initiative (SARi), which aims to determine how South Africa's renewable ambition could be substantially increased as part of its broader economic and industrial strategy. SARi has identified the potential for international sources of finance to stimulate privately-led investment in renewables through the provision of a combination of concessionary debt and risk guarantee instruments from international sources.

It addresses the constraints on government finances in a realistic manner and acknowledges that it will take more than a well-designed policy mechanism, such as a feedin tariff, to stimulate significant private investment.

However, it is encouraging that the government is undertaking a comprehensive review and many investors are hopeful that it will lead to positive action on policy and infrastructure.

THE INTERNATIONAL DIMENSION

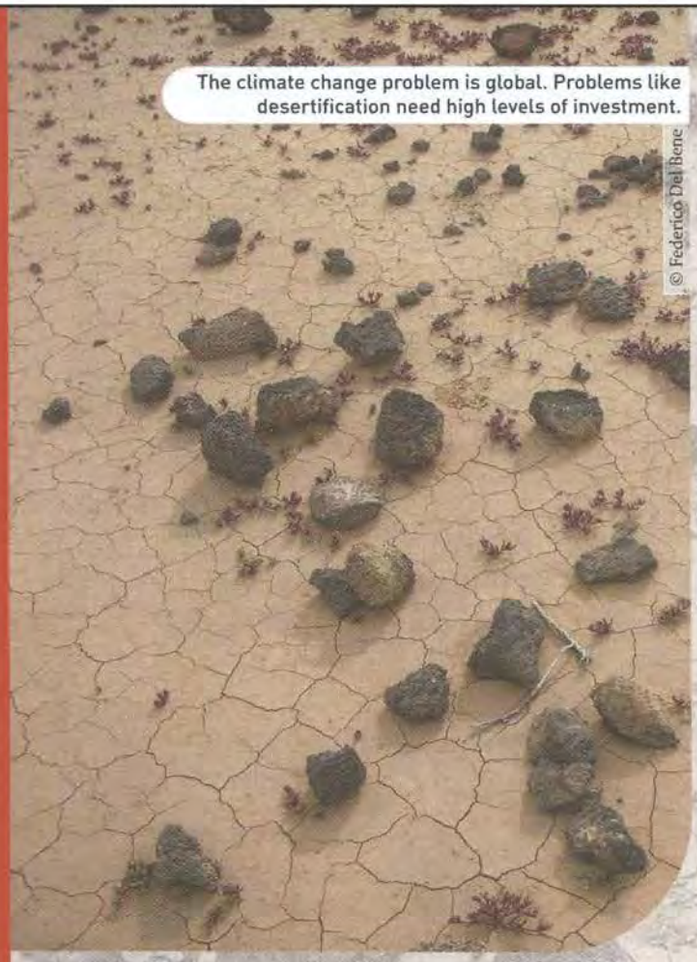
When it comes to specific investments, national, regional and even local policy frameworks are key. However, progress at the international level would also send a convincing signal to investors that there is strong global resolve to implement relevant policy measures.

Therefore, in addition to progress in individual developing economies, investors continue to support positive action at international level, including a binding international climate agreement which sets the framework for robust action on climate change. In addition, international agreement could provide an overarching global system of monitoring and review which registers, oversees and evaluates national action plans – and as such provides an important influence on and a guarantor of stable domestic policy.

Any international agreement should also support the development of robust carbon markets and a strong, sustained carbon price. Assigning a relatively high price to carbon sends a clear signal to companies and investors that reducing greenhouse gas emissions is a policy priority. Carbon markets also offer opportunities for companies to identify the most cost-efficient options to meet emissions reduction targets.

EFFECTIVE POLICY MEASURES

Lessons from other regions and other major development efforts, such as the Marshall Plan, the preparation for EU accession and sub-national infrastructure development programmes, suggest that the risks associated with investments in climate solutions in developing countries can be substantially reduced through a combination of policy and capacity building measures and the provision of public financing mechanisms. The latter should be based, as far as possible, on existing mechanisms such as export guarantees or lending arrangements by development banks and must be adapted as domestic policy frameworks are strengthened and carbon markets develop. It is also critical that any policy programmes are embedded within mainstream policy frameworks so that climate finance becomes more than just a niche activity for a small number of investors.



The climate change problem is global. Problems like desertification need high levels of investment.

© Federico Del Bene

scale required when effective policy frameworks are in place. Moreover, investment from the private sector cannot be an exercise in altruism. The universe of products competing for investor capital is extensive, and global and policy frameworks must create clear incentives for investment and minimise long-term policy risks – an especially important consideration in emerging markets.

THE CLIMATE CHALLENGE IS GLOBAL

Estimates suggest that around 85 per cent of the total investment necessary to effect the transition to a low carbon economy must come from private sources including institutional investors, such as pension funds.

> **"Private investors need a clear commitment from governments in the developed world that they will stand behind the developing world's efforts."**

Some may be surprised to know that around 60 per cent of this investment must be made in emerging economies. This figure underscores the importance of designing policy frameworks which are focused on the specific challenges facing developing countries. It is also a reminder that the climate challenge is a global one which requires a co-ordinated, global response.

For developing economies, establishing a functioning carbon market will be a key means of financing carbon reductions. While imperfect, Europe has a system in place through the Emissions Trading Scheme, Australia has recently introduced a carbon levy and China is reportedly planning to introduce a carbon tax from 2012. By contrast, many developing nations have not formulated a plan to manage carbon output, and are unlikely to act unilaterally, or even on a regional basis. However, an international agreement could help to bring developing economies within a carbon pricing scheme.

ASSISTANCE FROM THE DEVELOPED WORLD

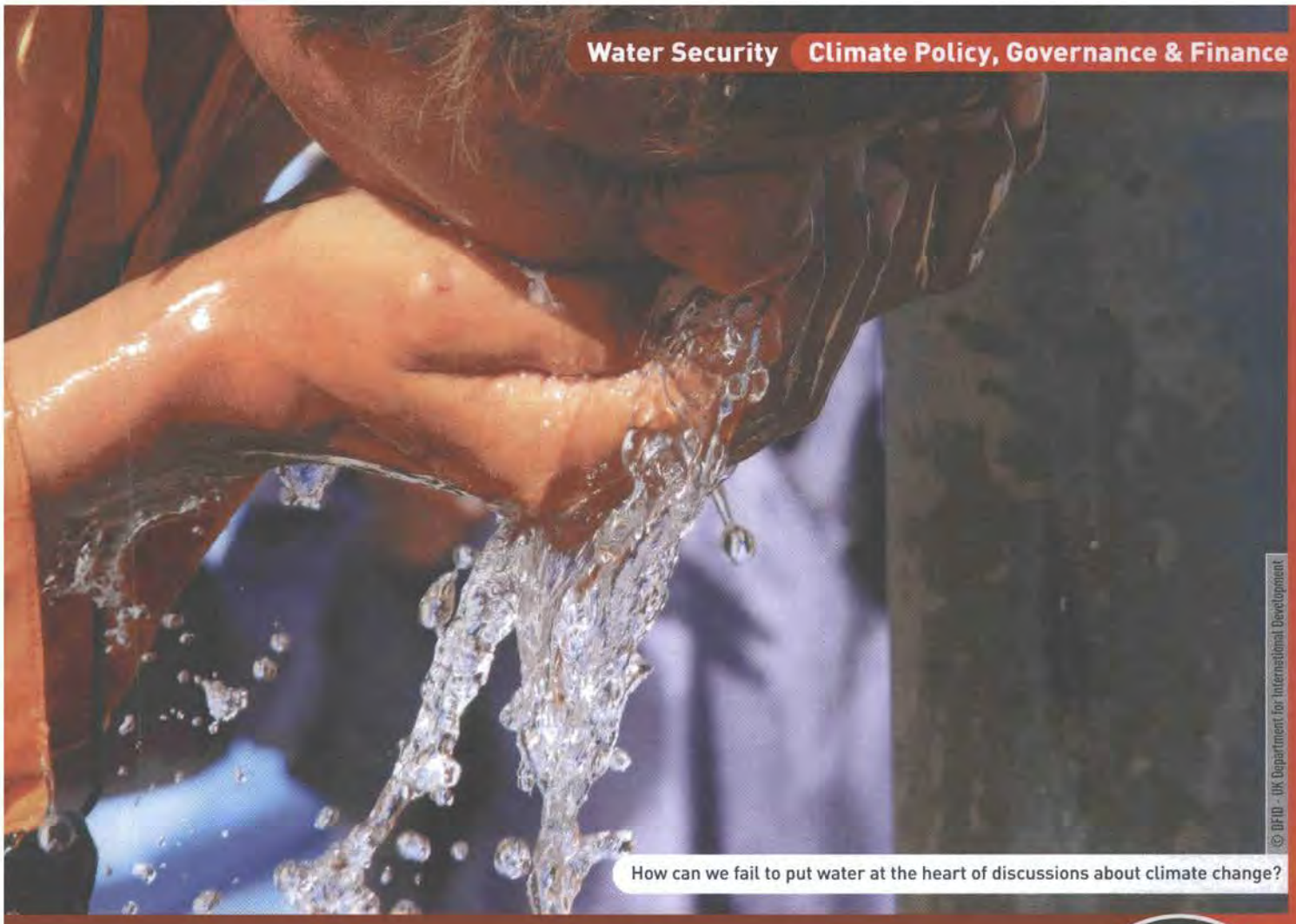
Some developing countries will need assistance from developed countries, both financial and knowledge based, to overcome barriers and adopt best practice climate solutions. In Copenhagen in 2009, developed countries pledged to mobilise US$100 billion a year by 2020 for climate change adaptation and mitigation in developing countries, but have since failed to outline how this money will be raised. Private investors need a clear commitment from governments in the developed world that they will stand behind the developing world's efforts to combat climate change. Discussions are under way about the establishment of a Green Climate Fund which will manage the delivery of adaptation and mitigation funding. It is critical that this is set up with a view to unlocking long-term private sector investment and has a mandate to consult directly with the private financial sector.

Private investors have a central role to play in financing the solutions which will combat climate change, but no matter how committed investors are, investment can only reach the

Stephanie Pfeifer is the Executive Director for the IIGCC. Previously, Stephanie worked in investment banking for over seven years, including as senior economist at Morgan Grenfell and Deutsche Bank in London. She holds an MSc in Environmental Studies and a BA in Philosophy, Politics and Economics from Oxford University and an MA in Economics from Exeter University.

The **Institutional Investors Group on Climate Change** (IIGCC) is the collaborative initiative for European investors on addressing climate risks and opportunities through engagement with policy-makers, companies and investors. The IIGCC now has more than 75 member organisations, including some of the largest pension funds and asset managers in Europe, with assets of around €7 trillion.

IIGCC, c/o The Climate Group, Second Floor, Riverside Building
County Hall, Belvedere Road, London, SE1 7PB, UK
Tel: +44 (0)20 7960 2987
Email: spfeifer@theclimategroup.org
nathan.williams@capitalmsl.com
Web: www.iigcc.org



How can we fail to put water at the heart of discussions about climate change?

Water must be at the heart of climate talks

By **Mr Loïc Fauchon**, President, World Water Council

Everywhere on the planet, the evolution of the climate is a common topic of conversation. To today's climate conditions, we should add popular concern over what climate we will have tomorrow; and we often forget about the conditions we had in the past. The climate and its daily indicator, the weather, is a topic on which each of the planet's inhabitants has his own view. For personal, ethical, religious or economic reasons, everyone is interested by the amount of sunshine, the ambient temperature, the rain and the wind. The climate, like food and health, is one of the subjects that form the most frequent basis for debates, conversations and arguments.

When we talk about the climate or the weather, we talk about the natural elements and how they are changing. We talk about the presence or absence of air or water. We talk about their importance, and for water, we measure quantity and quality.

So how can we fail to put water at the heart of discussions about climate change? Water is not just an ancillary element, but rather one of the main pillars of climate talks. In order to make water's voice heard, before the 2009 Copenhagen Conference the World Water Council (which brings together over 60 nations and almost 350 national and international organisations) proposed that the idea of an energy-climate package be replaced by that of a 'water-energy' package, to be placed at the heart of the climate change adaptation process.

> **"How can we fail to put water at the heart of discussions about climate change?"**

This proposal is more topical than ever, and as the Durban conference (COP17) draws near, we strongly reassert the need for such a change in emphasis. Indeed, while at COP16 in Cancun, the main breakthrough was to have water added to the agenda of SBSTA (the Subsidiary Body for Scientific and Technical Advice of

the UNFCCC), its importance is still underestimated in climate negotiations.

POVERTY AND THE CLIMATE

We all know that much of humankind lives well beyond the planet's capacities in terms of natural resources. We all know that we have to improve our ability to reduce greenhouse gases. We know that certain consumption patterns, and sometimes even our lifestyle, will have to change. But during talks of all kinds, it is also our duty to point out that these changes are much more difficult to make for the poor.

The climate might vary, but poverty is constant. Economic development and social harmony are the only realistic means of wiping out poverty little by little. We simply came to understand a few years ago that we must also respect nature and the resources it brings us.

Water is as vital to humankind and its survival as it is to nature and its protection. And yet almost one billion human beings still do not have sufficient water, and double that number do not have access to decent sanitation.

CITIES POSE THE THREAT

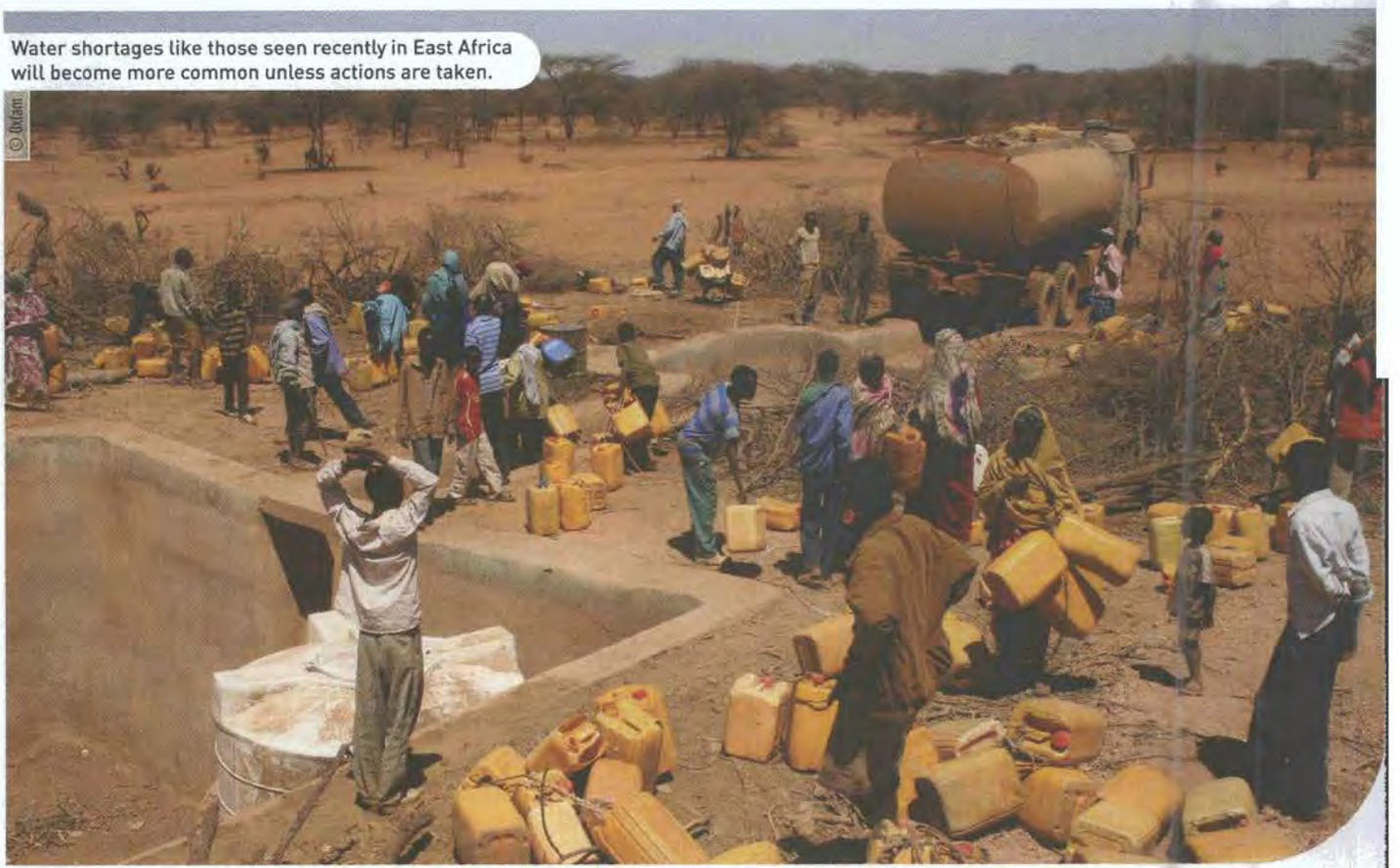
The climate is not, now or in future, the main hazard for the planet's water. The most imminent threat to its future is human behaviour as a whole, resulting from the fast-paced changes taking place worldwide: population growth, urbanisation, 'littoralisation' (moving to the coastline), higher standards of living, pollution and the destruction of the natural environment.

Humans are without doubt water's number one enemy and the climate must not be used as a scapegoat for their mistakes. People's insistence on gathering together in ever-larger cities and in saturated coastal regions is the biggest threat in the 21st century – far greater than rising waters and drought. Megacities are certainly showcases for the most outstanding technology, but in both the North and the South they are above all pits of poverty, ignorance and disease, an affront to human dignity.

> **“Humans are without doubt water's number one enemy and the climate must not be used as a scapegoat for their mistakes.”**

The mode of thinking whereby the future of humanity lies in the city must be debated and transformed. In the next fifty years, we have to invent adaptation to urban growth, rethink the distribution of humans on the earth's surface and create a new concept of less concentrated, less polluting and less energy-hungry cities.

The distribution of the world's fresh water resources will be a decisive factor. Water is more difficult to transport than energy. Currently, the water supply is not as close as required for the megacities, which are pollution traps and sometimes even sanitary time bombs.



Water shortages like those seen recently in East Africa will become more common unless actions are taken.

© Oxfam

A BATTLE ON SEVERAL FRONTS

The peaceful battle for water must be fought on several fronts. On the one hand, the availability and quality of resources must be improved. The global supply of fresh and drinking water must be increased to meet food and sanitary requirements, feeding the world and protecting public health. To this end, more money and knowledge must constantly be put into access to water and sanitation. This is more than a physical need; it is the recognition that the right to water is one of the cornerstones of human dignity.

> **“We must initiate a profound, lasting change in our behaviour.”**

And because all this will not be enough in the face of population pressure and increasing standards of living, we must initiate a profound, lasting change in our behaviour. Technology is already helping us make that change through drip irrigation systems for plants and gardens, water-efficient washing machines and dual-flush toilets. But we will go further to rediscover the real virtues of saving water and the obligation to save water under all circumstances. The poor never stopped doing it, and other more fortunate people have become aware.

A WORLD WATER–ENERGY FUND

Some populations are as thirsty as they are hungry. The World Water Council sees climate talks as a major opportunity to remind the international community that intelligent investment in water infrastructure could facilitate adaptation to the enormous demand for water. It is a minute cost compared with long-term repairs due to climate uncertainties.

We also want to persuade the international community that better water management is vital for a number of future energy solutions. The increasingly strong link between water and energy forms part of a nexus that extends not only to food security, but also to health. Both will benefit from the commitments we make to increase and diversify water and energy supplies, while protecting ecosystems.

To achieve this, the World Water Council is once again proposing that a significant portion of the financial resources granted to the poorest countries for their adaptation measures be devoted to guaranteeing access to water and sanitation for populations currently deprived of them. We call upon the global community to establish a World Water–Energy Fund.

The water part of the fund would be made up of two key elements: the first, ‘Water for Health’, would aim to reduce radically the number of deaths due to water-borne disease. The second, ‘Water for Food’, would promote water for the development of local agriculture, for a more direct food supply to poor and malnourished populations.

Obviously, the creation and monitoring of this world fund would be placed under international control, set up by the financial backers and the United Nations.

THE WORLD WATER FORUM

The creation of such a fund must not obscure the many and varied solutions that must be implemented to make water a genuine priority in world politics. This is why the water community is working to make the 6th World Water Forum the ‘Forum of Solutions’. In Marseille, France, from 12 to 17 March 2012, we will move from words to deeds, from ideas to solutions. Long-term reflection must clearly be accompanied by short- and medium-term commitments.

> **“The increasingly strong link between water and energy forms part of a nexus that extends not only to food security, but also to health.”**

One of the major challenges of the future is responding together to the issues of climate, water and energy. Let us hope that the dialogue opened up in preparation for COP17 can contribute to it.

Mr Loïc Fauchon is President of the World Water Council. He has been a Governor of the Council since 2000, before being appointed President in March 2005. After an early career in tourism and local government in southern France, he joined the General Management of the Marseilles Water Supply Company (SEM) and became President-General Director in 1997. Loïc Fauchon also served as Mayor of Trets, France, from 1989 to 1992. In 1977, he created the association Transahara with which he has travelled to Romania, Bosnia, Mali and Tunisia on emergency and development assistance missions.

The **World Water Council**'s mission is "to promote awareness, build political commitment and trigger action on critical water issues at all levels, including the highest decision-making level, to facilitate the efficient conservation, protection, development, planning, management and use of water in all its dimensions on an environmentally sustainable basis for the benefit of all life on earth." The Council was established in 1996 on the initiative of renowned water specialists and international organisations, in response to an increasing concern about world water issues from the global community.

World Water Council
Espace Gaymard
2-4 Place D'Arvieux
13002 Marseille
France
Tel: + 33 4 91 99 41 00
Web: www.worldwatercouncil.org

CONAGUA
Comisión Nacional del Agua

Water management – confronting climate change from Mexico to Durban

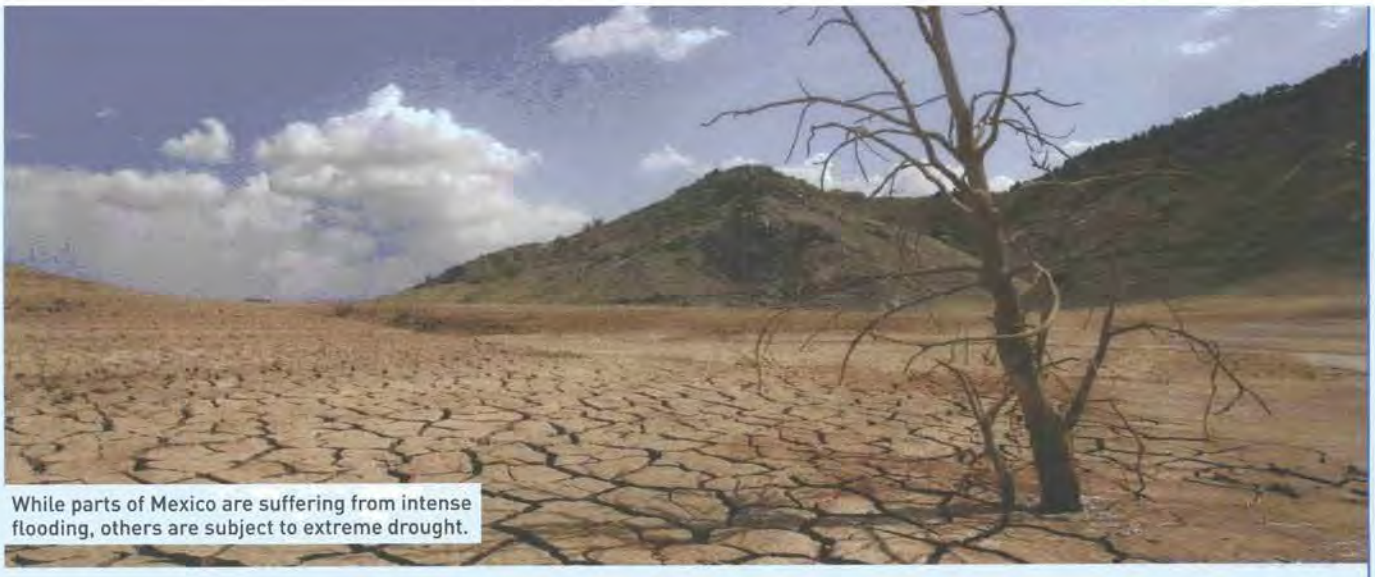
It is increasingly recognised that water is the primary means through which climate change impacts on societies and the environment. Rather than being viewed as a sector, water resources are the medium through which climate change directly impacts food security, health, energy generation, development planning and the protection of ecosystems and biodiversity. Scientific evidence to date suggests that climate change implies changes in precipitation and runoff patterns, saltwater intrusion into freshwater reservoirs in coastal areas, as well as an increase in the magnitude and frequency of extreme hydro-meteorological events such as droughts and floods. It is therefore essential to strengthen co-ordination between water planning, land use and urban planning in order to promote economic development and reduce risks to human settlements arising from extreme hydro-meteorological events.

The economic arguments for co-ordinated planning are compelling – a recent study by the Economic Commission for Latin America and the Caribbean on *The Economics of Climate Change in Latin America and the Caribbean* (ECLAC, 2011) shows that in the Caribbean, taking action now on both adaptation and mitigation will cost two and three per cent of GDP, whereas the cost of inaction could be five per cent of annual GDP. Clearly investment in climate-proofing water resources, infrastructure and management structures is a sound economic investment.

INTERNATIONAL ACTION ON WATER AND CLIMATE CHANGE

In Mexico water is considered a strategic matter of national security. It is recognised that climate change threatens this resource, and thus jeopardises the security of the nation. This recognition is based on the firm conviction that if the impacts of climate change on water resources are not fully understood, and if appropriate adaptation and prevention measures are not planned now, the cost of taking reparatory action in the future will be much higher. This is particularly relevant for the poorest populations, who are often the most vulnerable to the effects of climate change

Atypical rainfall in February 2010 caused heavy flooding in the Valley of Mexico.



While parts of Mexico are suffering from intense flooding, others are subject to extreme drought.

on water resources, be they extreme water-related events or the decrease in quantity and quality of water resources for everyday activities, such as food production and energy generation. As a consequence the Government of Mexico has taken steps nationally and internationally to confront the challenges climate change poses to the sustainable management of water resources.

During the 16th Conference of the Parties (COP16) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2010 in Cancun, Mexico, the Mexican Federal Government, through the National Water Commission (Conagua) organised the Dialogs for Water and Climate Change (D4WCC), bringing together over 600 experts and decision-makers from national and local governments, multilateral and civil society organisations and academia, in a week-long programme. Called for by the international development community, the D4WCC made the case for the formal recognition and consideration of water resources in the climate change debate. But more than simply raising the profile of water issues, the Dialogs clearly demonstrated that the water community is already organising itself to deal with the growing impacts of climate change on water resources, not in a hypothetical future, but in the here and now.

The event highlighted the importance of institutional arrangements which facilitate close links between related ministries, thus accepting the 'three I's' (Institutions, Information and Infrastructure) as a basis to focus efforts in development planning. The discussions also examined how the private sector can be, and is, getting involved in climate change adaptation and mitigation through efforts to reduce their water and carbon footprints, as well as with research and development on innovative clean technologies.

Furthermore, the event served as a platform on which global climate change concerns were shared alongside regional initiatives, such as the Regional Policy Dialog on Water and Climate Change Adaptation in the Americas that CONAGUA is leading along with 22 organisations; national mechanisms, such as Mexico's draft Water-Based Climate Change Adaptation Strategy; and local initiatives, such as the water reserves for the environment, already being implemented with multi-stakeholder participation in different parts of Mexico.

CONAGUA strongly believes that the D4WCC have created a precedent for the coming together of the water, development and environmental communities, within the framework of the COPs on climate change. In December 2010, the D4WCC served their initial purpose, but there was a general sense to continue building upon these successes to strengthen the capacity to respond to the challenges of climate change for water resources, over the coming months and years. As such CONAGUA has remained active since the COP16 building upon the tangible outcomes reached, and hopes to continue generating positive momentum in COP17.

FROM CANCUN TO DURBAN

More than an event, the D4WCC constitute an ongoing initiative in which Mexico remains engaged, reflecting its interest to contribute to the common understanding and shared vision around this key concern for the environmental protection, social well-being and the economic development of our societies. There is widespread support for the continuation of this activity, a continuation in which Mexico, through CONAGUA, is keen to play a key role globally. Thus Mexico stands ready to work alongside South Africa, the host country of COP17, to continue pushing for this issue of strategic importance.

CONAGUA is the National Water Commission of Mexico, an administrative, normative, technical, consultative and decentralised agency of Mexico's Ministry of the Environment and Natural Resources (Semarnat). CONAGUA's mission is to manage and preserve the nation's water resources and its inherent public goods to achieve a sustainable use of these resources, with the co-responsibility of the three tiers of government and society at large. With 13,000 staff members nationwide, it is the world's largest water authority.

José Luis Luege Tamargo
Director General, CONAGUA

Insurgentes Sur 2416, Piso 4. Col. Copilco El Bajo, CP 04340, Mexico
Tel: +52 (55) 51 74 44 61/62 | Email: cinternacional@conagua.gob.mx
Web: www.conagua.gob.mx; www.d4wcc.org.mx

© WFP/Vanessa Vick

Uganda. In some countries there are more women farmers than men. Empowering women is a key pillar of addressing current and future hunger challenges.

A climate for ending hunger

By **Sheila Sisulu**, Deputy Executive Director for Hunger Solutions and **Carlo Scaramella**, Coordinator, Climate Change, Environment and Disaster Risk Reduction, World Food Programme (WFP)

The global food system is failing almost one billion people. To put it in perspective, this exceeds the combined number of people who live in the European Union, the United States, Japan, Canada, and Australia. Adding to this is another billion who suffer from the 'hidden hunger' of not having enough vitamins and minerals to be assured normal physical and mental growth. Twenty years after the first global conference on sustainable development, almost a quarter of the world's population still doesn't get enough to eat. And climate change is expected to make their situation much worse.

Interestingly, while there are many uncertainties about the impacts of a changing climate, we know enough about ways to address the hunger problem and to potentially eradicate hunger for everyone now.

The challenge is that to put in practice what we know would entail a radical transformation of the way we grow and exchange food, and support those who are food insecure. For example, food must be grown sustainably, so that the natural environment is enhanced for the next generation to continue to produce food. Food must be nutritious and accessible, so as not to exclude people and communities. The economics of growing and selling food must contribute to building resilient systems and livelihoods that allow the poorest people who largely still live on the land and grow their own food to enjoy healthier lives. And assisting women – who make up the bulk of the world's poor, subsistence farmers – must be put at the centre of our efforts.

THE URGENCY OF CLIMATE CHANGE

The recent reports from the Intergovernmental Panel on Climate Change (2007) make it clear that a general warming of the planet and more severe and erratic weather will have profound effects on food production, and that an especially negative impact can be expected on the so-called 'bottom billions' – people living in the poorest countries and in the poorest communities, those who are already vulnerable and food-insecure. In this context, the most important findings include the following:

Food production and availability will decline. Estimates from the International Food Policy Research Institute and other institutions suggest that the risk of hunger could increase by up to 20 per cent by 2050, due to the impact of climate change on productivity alone. About 65 per cent of

Pakistan. After wreaking havoc in the mountainous north-west, the floods in Pakistan descended on the heavily populated Punjab region, home to over half the country's population.

this increase is likely to be seen in sub-Saharan Africa. The number of malnourished children is also expected to increase, with projections as high as a 21 per cent increase, or 24 million children (*Climate Change and Hunger – Responding to the Challenge*, WFP 2009). This will come at a time when the world's population is likely to surpass nine billion. To ensure adequate food and nutrition for the world's population under a scenario of no climate change will require us to raise production by another 60 to 70 per cent (*How To Feed the World in 2050*, UN Food and Agriculture Organization, FAO 2010) – which makes the challenge under a climate change scenario a daunting task indeed.

Disasters will increase in frequency and intensity. The 'new normal' in disasters is already characterised by more unpredictability and severity. In 2010, climate-related extreme events and disasters affected some 300 million people, most often in countries which have very little capacity to cope. Floods alone affected the lives of almost 200 million people, the highest number of people impacted by floods in a decade.

Among the poorest communities, exposure to disasters often means the loss of the few assets that support subsistence livelihoods, and the triggering of 'negative' coping strategies that may affect, for example, educational opportunities for children, access to nutrition, the ability to manage the natural environment on which the livelihoods of most poor people still depend, and distress migration. Disasters push vulnerable communities into poverty. For example, the 2010 floods in Pakistan displaced some 2 million people and seriously set back earlier efforts to bring another 20 million people out of poverty.

Environmental degradation will accelerate and worsen. In Africa alone, some 650 million people already live on degraded lands. Four times the amount of nutrients is being removed from the soil as is being returned. With climate change, two-thirds of the region's arable land could be lost by 2025 (FAO 2008, *Challenges for SLM in Africa*). Population growth and over-use of water is already impacting food production and health, and climate change will make water an even more scarce and precious resource. Land and water degradation will exacerbate resource competition and social tensions, and accelerate unplanned population movement and urbanisation, with serious consequences for governance and human security.

Food prices will become even more volatile. The fuel and food price crisis of 2008 is a warning of what future global food markets may look like, with hundreds of millions of people suddenly unable to access food as prices rise. Multiple factors contributed to the crisis, including drought and floods affecting breadbasket regions and countries, the surging demand for staple food from more affluent emerging economies, as well as the displacement of food crops for biofuels.

> **“Disasters push vulnerable communities into poverty.”**

A volatile food market with rising prices for the most common food crops will push more poor people into hunger. Poor people spend up to 70 per cent of their incomes on food, and for them the margin between earning and spending, between food and hunger, is razor thin. They have no savings accounts, no assets of value, and little to fall back on when times get tough. The recent Oxfam report *Growing a Better Future* estimates rising food prices in the range of 70-90 per cent by 2030, without taking into account the effects of climate change. With climate change, the report concludes, food price rise projections for maize, wheat and rice are as high as 120-180 per cent.

In sum, climate change will exacerbate underlying food insecurity drivers, acting as a 'hunger-risk multiplier'. The scale of forces at play, the speed and irreversibility of the changes under way, the new risk threshold – the number

© WFP/Riccardo Gangale

Rwanda. By engaging communities in constructing terraces, soil erosion can be limited, surface runoff managed, and landscapes can be transformed to support resilient livelihoods.

of people affected and at risk of hunger – coupled with a general lack of preparedness to manage multiple stresses at the national and global level, are unique and unprecedented.

WE KNOW WHAT WORKS

As dire as the future could be, a far more depressing situation would be our inability to act and show leadership on the basis of what we know works, which can contribute to address the hunger problem today, and in the warmer world of the future.

We know that enhancing food systems to deliver multiple benefits can lead to enhanced production and greater resilience and sustainability. Increasing the production and availability of nutritious food is fundamental to achieving food security. But increasing production must be achieved in ways that are both environmentally sustainable and socially inclusive. The sustainable intensification of agriculture will require agricultural systems that enhance output while sustaining the natural resource base.

Pre- and post-harvest management also is instrumental in ensuring availability of food. In most developing countries huge gains can be achieved among poor smallholders by reducing post-harvest losses, especially in countries with poor infrastructure and management capacities. For example, in Africa, it is estimated that cutting post-harvest production losses could lead to an increase of food availability of up to 40 per cent (*Global Food Losses and Food Waste*, FAO 2011).

We know that promoting access and social protection is critical to fighting hunger and fostering inclusive and more equitable development pathways. Having enough food in markets is not sufficient to ensure that all people, at all times, have access to nutritious food. We know that hunger is to a large extent a challenge of distribution, entitlement and access. Modern agricultural production systems have been designed to focus primarily on maximising production, with very little attention for the majority of world food producers – mainly the hundred millions of farmers and smallholders as well as subsistence and landless people and their families, who in many cases are left in the margins of mainstream development. For these vulnerable people, inclusive rural development policies coupled with productive safety nets and social protection interventions are critical to ensure access to food and nutrition security, especially during shocks and post-disaster recovery periods.

Among others, WFP has demonstrated that the cost of hunger far exceeds the necessary investments in people's food security and nutrition, and countries like Chile or Brazil provide live examples of the importance of effective social protection and nutrition policies for national development.

> **“The cost of hunger far exceeds the necessary investments in people's food security and nutrition.”**

Safety nets and similar transfer investment programmes must become an integral part of the provision of public goods at the national level. There is wide recognition today that these types of social investments in the poorest and most food-insecure are not so much a cost as an investment, not only in peoples' welfare, but also in terms of economic growth. A classic example is provided by Brazil's Zero Hunger programme which dramatically reduced hunger through investments, at a cost of about one per cent of the national budget. As a comparison, the estimated cost of hunger amounts to as much as 11 per cent of gross domestic product in some countries (*The Cost of Hunger*, WFP 2008).

We know that developing systems for risk management allows people to cope with the unpredictable. Building climate proof food systems and enhancing people's resilience to climate change are two closely intertwined objectives. Among poor communities living in fragile lands and ecosystems, it is critical that both livelihood protection and innovative risk management tools and services are provided and made affordable. Integrating disaster risk management and climate risk analysis into planning is becoming an urge...

COMMUNITY RESILIENCE AND HUMANITARIAN CRISIS IN THE HORN

The current drought-related food security and humanitarian crisis in the Horn of Africa is affecting more than 13 million people. The crisis is most acute and exacerbated in areas where governance and security problems as well as a lack of investment in resilience are more pronounced, like in Southern Somalia. By comparison, in communities in countries such as Ethiopia, Kenya and Uganda, WFP and partners have been supporting national resilience initiatives. These investments have protected livelihoods and promoted rural development that has helped local communities better manage risk and prevent a further spread of the crisis.

While much more is needed, this highlights that by investing early in people's resilience, hunger and its subsequent implications can be avoided.

requirement, especially in fragile and risk prone countries and regions. These solutions can also include risk transfer schemes (crop insurance for example), early warning systems to trigger contingent funds and rapidly scale up response-systems, risk reserves in the form of savings, as well as physical disaster risk reduction and adaptation measures built by local people to protect lives and livelihoods. By putting in place protective measures in time not only can human suffering be limited, but it is also money well spent – as pointed out by the Humanitarian Emergency Response Review (HERR 2011), which estimated that every pound spent to build resilience saves four in response.

We know that women are the key to household food security. Women dominate the agriculture sector and account for over 60 per cent of the agriculture workforce in some countries and are the main producers of much of the food required to meet household needs. Surveys from a wide range of countries further suggest that up to 90 per cent of the time required to prepare food for consumption is done by women (State of Food and Agriculture FAO 2010). In Africa, it is estimated that about 80 percent of the continent's smallholder farmers are women (*Realising a New Vision for Agriculture*, World Economic Forum 2010). However, women have far fewer resources than men do to help them and their families adapt and respond to emerging challenges. Far more than men, women are denied access to essential inputs like credit, fertiliser, extension services, and improved seed, or livestock. And women can often not assume title for a piece of land.

“Ensuring social protection and safety nets for the most vulnerable and food-insecure must be a policy goal for all societies.”

Eliminating the gap between men and women in access to agricultural resources and inputs could raise yields on women's farms by 20-30 per cent, which in turn could reduce the number of undernourished people in the world by 12-17 per cent, or 100-150 million people (*Women in Agriculture*, FAO 2011). Empowering women is therefore a precondition for ending hunger.

ACTING NOW AND FOR THE FUTURE

A global system that leaves billions of people in poverty and hunger is not sustainable. Priorities going forward must aim at enhancing the focus on sustainable food systems that link production to natural resource management and access issues, developing robust and resilient livelihoods, and ensuring food security and nutrition outcomes for all. In this context ensuring social protection and safety nets for the most vulnerable and food-insecure must be a policy goal for all societies, especially under the new climate change scenario. And we must enhance our focus on women as the engine of change.

MERET – BUILDING RESILIENCE AT SCALE

Having an unparalleled capacity to reach and engage food-insecure communities is one of WFP's trademarks. WFP supports programmes that address food security and resilience building outcomes in a large number of countries. MERET, a longstanding productive safety net programme in Ethiopia, is perhaps the best known success story. Under MERET, the Government of Ethiopia, together with WFP, have built community resilience to a wide array of different shocks. Households participating in MERET have seen an increase in food security by 50 per cent. The programme has rehabilitated over a million hectares of land, and reforested another 600,000, ultimately transforming the landscape; and has enabled households to raise their incomes and build sustainable livelihoods. Experiences from programmes of this type are ready to be scaled up and can be replicated.

Fortunately, there are many good experiences to build on. Innovative people, communities and countries offer convincing examples of inclusive, sustainable and scalable solutions. More is needed. One of the crucial requirements is a global, concerted transformative effort focusing on people's livelihoods, landscapes and food systems. It is only by developing an integrated vision of these factors, and by fostering more inclusive development pathways, that we can achieve food security now, and under the far more difficult conditions of a radically altered climate.

Sheila Sisulu became Deputy Executive Director for Hunger Solutions in the Office of the Executive Director of the World Food Programme in January 2008. Prior to this appointment, Ms Sisulu served as WFP's Deputy Executive Director for Policy and External Affairs Department from 2003. Before joining WFP, Ms Sisulu was South Africa's Ambassador to the United States. Her diplomatic career began in 1997 as Consul General in New York and as Ambassador to Washington two years later.

Carlo Scaramella has led the activities of the World Food Programme in the areas of climate change, environment and disaster risk reduction since mid 2009. Before this, Mr Scaramella has been Chief of WFP's Emergency Preparedness and Response Branch, with former extensive field experience with WFP and other UN agencies and institutions in many countries, including El Salvador, Angola, Sudan and Somalia. He is an Italian national and holds a Doctorate in Political Science.

The **World Food Programme** (WFP) is the United Nations frontline agency in the fight against global hunger and food insecurity. Its mission and mandate is to save lives in emergencies, protect and rebuild livelihoods in post-conflict situations, address acute and chronic hunger, and build capacities to prevent and tackle the long-term causes of hunger and food insecurity.

For more information on WFP's climate related work, visit www.wfp.org/climate-change *or contact* wfp.climatechange@wfp.org

Via C.G.Viola 68, Parco dei Medici, 00148 Rome, Italy
Tel: +39 06 65131 | Fax: +39 06 6590632 | Web: www.wfp.org

New Holland Agriculture: farming technology of tomorrow

New Holland has been providing solutions that improve farming efficiency and productivity by using accessible technology since 1895. It offers cash crop producers, livestock farmers, contractors, vineyards and groundcare professionals the largest choice of easy-to-operate tractors, harvesters and material handling equipment: more than 80 product lines and over 300 models. New Holland complements the widest agricultural equipment offering in the world with effective parts and service support and a range of tailored financial services from a specialist in agriculture. An approachable and professional global dealer network always guarantees total assistance and expert advice season after season. Close to customers in all fields, New Holland is the reliable partner of each farmer.

As one of the world's leading makers of agricultural machinery, New Holland Agriculture is well aware that the focus must be not only on productivity and efficiency, but also on the environmental impact of technology applied to agriculture. In 2006 New Holland launched its Clean Energy Leader strategy for the active promotion of renewable fuels, emissions reduction systems and sustainable agricultural technology. Today biodiesel, ECOBlue selective catalytic reduction (SCR) Tier 4 solutions, biomass, NH2 hydrogen tractor and the Energy Independent Farm, as well as carbon footprint reduction, form the foundation blocks for this strategy.

AGRICULTURAL MECHANISATION IN EMERGING MARKETS

The issue of climate change has particular resonance in emerging countries, where agricultural development is playing a key role in the search for food security and renewable energy sources. Well planned and executed mechanisation is at the heart of achieving sustainable development in the agricultural sector.

The African continent is a case in point: many countries are investing to develop their agriculture, running large-scale projects to help this process, bringing new land into cultivation and boosting productivity in existing and new farms.

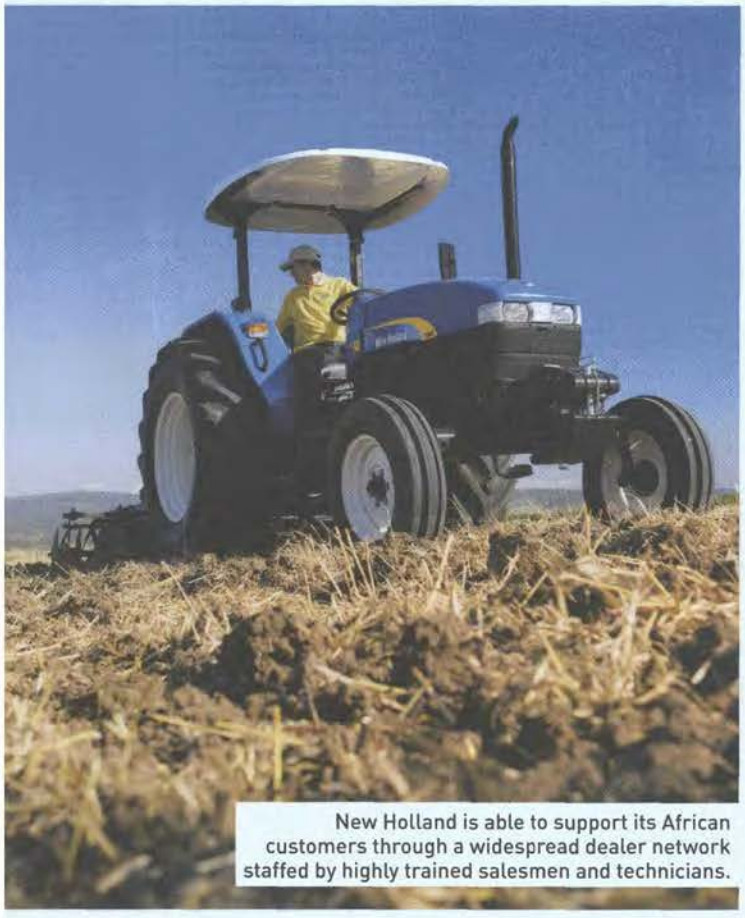
New Holland has the resources to develop different business models to meet the diverse needs of these countries as they evolve. It has an extremely wide product offering,

Close to customers in all fields, New Holland is the reliable partner of each farmer.

New Holland has developed the technologies and equipment that meet the specific requirements of African farming – from simple, robust tractors that are easy to use and service to the high-horsepower models bristling with productivity-boosting features

capable of meeting the needs of small and medium farmers as well as the large-scale projects that are being funded or promoted by governments and international organisations.

With research and development centres and manufacturing plants based in high growth and emerging markets, New Holland has developed the technologies and equipment that meet the specific requirements of African farming – from simple, robust tractors that are easy to use and service to the high-horsepower models bristling with productivity-boosting features, as well as a wide range of baling and harvesting equipment.



New Holland is able to support its African customers through a widespread dealer network staffed by highly trained salesmen and technicians.

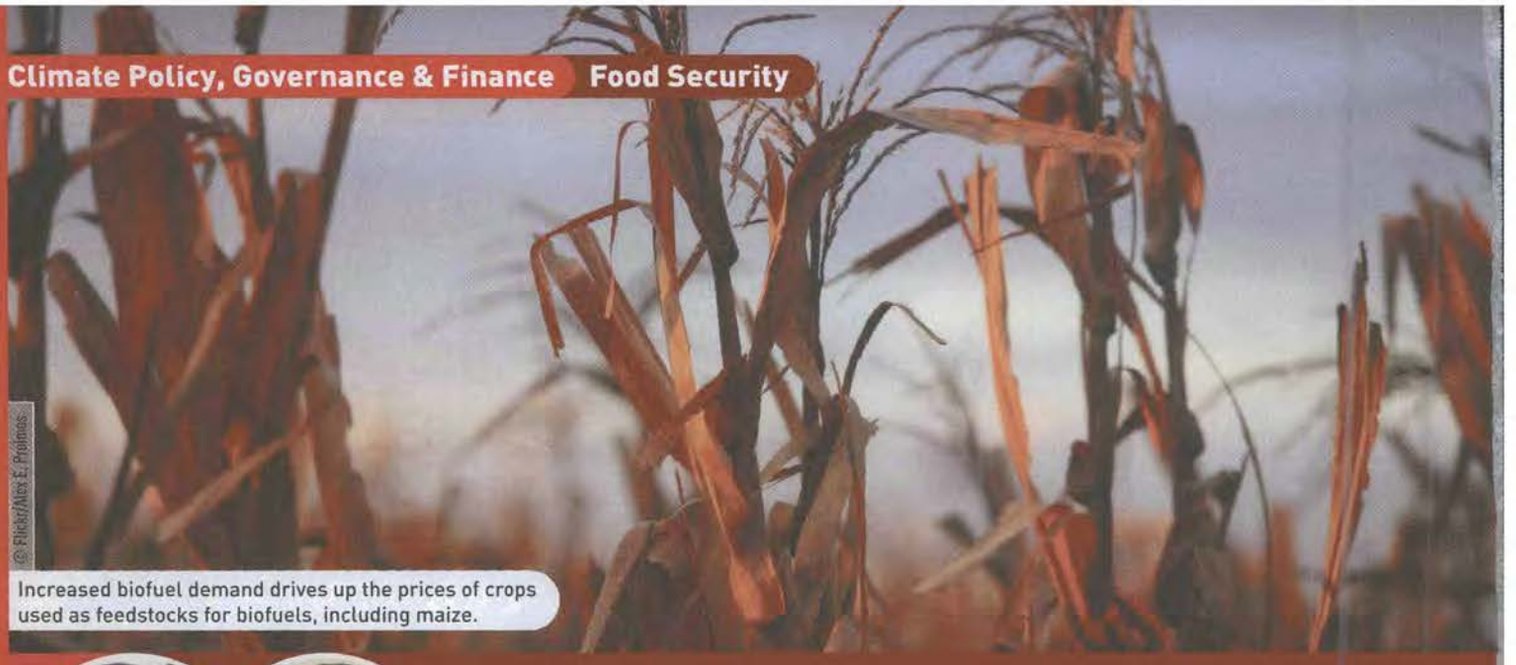
“Well planned and executed mechanisation is at the heart of achieving sustainable development in the agricultural sector.”

Most importantly, New Holland is able to support its African customers through a widespread dealer network staffed by highly trained salesmen and technicians. Also, as the large-scale mechanisation projects have gone into implementation, New Holland has set up the infrastructure, through its local company's sites and dealer network, to meet the need for training on the latest technologies available on its high-productivity equipment.

New Holland's capacity to support these large-scale agricultural mechanisation projects is shown by its participation in recent government programmes in Tanzania, Mozambique and Ghana, where it delivered important supplies of tractors, as well as technical support and training.

ECOBlue and NH2 are New Holland trademarks.

Email: international.media@cnh.com
Web: www.newholland.com
www.thecleanenergyleader.com



© Flickr/Alex E. Proimos

Increased biofuel demand drives up the prices of crops used as feedstocks for biofuels, including maize.

Biofuels and food security

By **Shenggen Fan**, Director General, and **Tolulope Olofinbiyi**, Research Analyst, International Food Policy Research Institute (IFPRI)

The recent increases and volatility in the prices of food are fuelling new concerns over the food security of poor people. Biofuel expansion is a major driver of food price trends and it puts at risk the food security of the poor, since it competes with food availability. A comprehensive approach is needed to balance the needs for food and fuel, and ensure sustainable food security. This approach should include effective policies and technology investments to minimise the food-fuel competition; social protection; transparent, fair, and open global trade; a global, emergency, physical, grain reserve; policies and investments to promote agricultural growth in the face of climate change; and an international working group to regularly monitor the world food situation.

According to the Food and Agriculture Organization (FAO) of the UN, the global prices of maize and wheat have almost doubled between June 2010 and March 2011 (Figure 1). Many developing countries have also experienced high food inflation in recent months, including those that are home to large numbers of poor people. For example, food inflation rose to 10 per cent in China and 18 per cent in India between December 2009 and December 2010, mostly driven by higher prices of meat, fish, eggs, dairy, vegetables, and fruit.

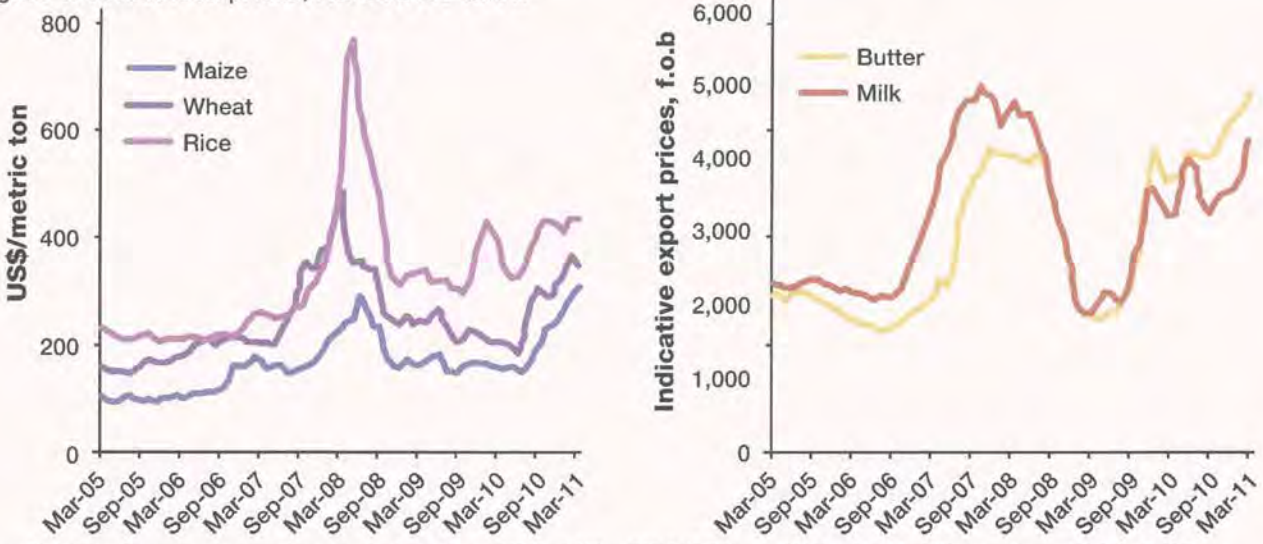
BIOFUEL DEMAND IMPACTS ON FOOD PRICES AND FOOD SECURITY

The expansion of biofuel production is a major driver of food price trends. The surge in demand for biofuels is driven by rising oil prices, as well as generous biofuel mandates and support policies, particularly in the US and EU. The United States Energy Independence and Security Act of December 2007, for example, calls for an increase in biofuels use to 36 billion gallons by 2022, of which 15 billion gallons will be mainly from maize-based ethanol. Indeed, more than one-third of the 2009 maize production in the US was used for fuel ethanol in 2010, according to the Earth Policy Institute. Research evidence suggests that the diversion of crops from food or feed to biofuel production is a significant source of demand-induced pressure on agricultural markets. Increased biofuel demand drives up the prices of crops used as feedstocks for biofuels, including maize in the US and oilseeds in Europe. Higher maize and oilseed prices, which are quickly transmitted to global markets, have knock-on effects on the prices of other agricultural products, such as livestock. Growing biofuel demand also adds substantially to the depletion of already low global grain stocks, thus eliminating an important instrument for addressing food price crises and protecting food-insecure people.

Global biofuel production is expected to expand in the future. Projections from the Organisation for Economic Co-operation and Development (OECD) and FAO show that biofuel production will more than double between 2007-09 and 2019. If current biofuel policies remain in place and oil prices stay high, the prices of agricultural commodities used as feedstocks for biofuels could remain substantially higher and volatile in the coming decades. Moreover, rising biofuel demand will put additional pressure on land and water resources, thus threatening both global food security and environmental sustainability.

Poor people are extremely vulnerable to the effects of biofuel expansion as it puts at risk their food security. Rapid increases in food commodity prices as well as excessive price volatility are harmful for poor consumers who spend a

Figure 1. Global food prices, March 2005-2011.



Source: FAO, 2011. International commodity prices database. Maize = US No 2, Yellow, US Gulf; Wheat = US No 2, Hard Red Winter ord. prot, US f.o.b. Gulf; Rice = White Broken, Thai A1 Super, f.o.b Bangkok; Butter = Oceania, indicative export prices, f.o.b.; and Milk = Whole Milk Powder, Oceania, indicative export prices, f.o.b.

large proportion of their income on food and have limited capacity to adjust quickly to large price increases. In response to rapid food increases, they cut back on quantity and quality of food consumed. For poor agricultural producers, higher food prices can only be beneficial, through higher incomes, if they are net sellers of food and if input costs do not rise in parallel. In recent years, however, input costs such as fertiliser and transport costs have also been high and volatile. Increasing costs as well as the uncertainty that comes with excessive price volatility in both input and output markets can reduce producers' profit margins, distort long-term planning, and dampen the incentives to invest more in productivity improvement. In addition, poor small farmers who depend on already fragile agroecosystems have limited capacity to adapt to increased stresses on land and water resources due to biofuel expansion.

ACTIONS NEEDED TO MINIMISE FOOD-FUEL COMPETITION AND ENHANCE FOOD SECURITY

Looking forward, the challenges in enhancing global food security will continue to grow. In addition to grain-based biofuel needs, global food and agricultural systems will need to feed more people with a wider range of foods and also meet feed needs. According to the UN, world population is expected to reach 9 billion by 2050, with growth coming mainly from urban areas and developing countries.

Rural-urban migration and higher incomes are increasing total food demand, and changing the quality, diversity, and composition of the food demanded. In addition, diet shifts from cereals to high-value foods, such as meat and dairy, are increasing demand for animal feed based on grain and protein. A comprehensive approach is needed at the national and global levels to balance the needs for food and fuel, and ensure sustainable food security. This approach, which comprises policy actions and investments, should include:

- **Effective policies and technology investments** to minimise the food-fuel competition. Public policies, particularly in the US and the EU, should aim to curtail and reform existing biofuel policies and subsidies, so as to maximise environmental benefits while minimising the volatility that biofuels demand may have induced into international and domestic food markets. One measure would be to include provisions to reward lower carbon intensities in biofuel production such as using inputs that are more energy-efficient than grain feedstock. Reduction of the non-food demand for grains can also relieve some of the pressure on food markets. Recent research from the IFPRI suggests that trade liberalisation under the current US and EU biofuel mandates can offer important benefits such as greater reduction in global greenhouse gas (GHG) emissions, lower global fuel prices, and smaller global price increases for agricultural products. In the long run, the benefits and threats of food crop-based biofuel production for food security and environmental sustainability need to be carefully evaluated in terms of their real contribution towards lowering GHG emissions and the carbon-intensity of transport fuels. Investments should be made in the development of new technologies that allow for more effective production of biofuels that do not compete with food availability.
- **Social protection, especially social safety nets,** to protect the most vulnerable groups in developing countries, including women and young children, from negative shocks. Despite strong advocacy for creating social safety nets to protect the most vulnerable, many countries have failed to put them in place. In the short term, safety net programmes should be scaled up by national governments in countries that already have them in place. In countries lacking established safety net programmes, governments should begin the development of these immediately with a focus on the areas with extreme hunger, and should draw on best practices from other countries. Safety nets should consist of interventions that increase productive capacity and improve the health and nutrition of vulnerable households. It is also important that the design of these interventions is gender-sensitive. That is, that it considers the complementarities and trade-offs between the role of women in agricultural production and childcare, for example.
- **Transparent, fair, and open global trade** to enhance the efficiency of global agricultural markets. National governments should eliminate existing export restrictions, such as export bans, and refrain from imposing new ones.

Although export bans may help to secure domestic food supply, they lead to tighter markets for other exporting countries and induce panic purchases by food importing countries, both of which fuel further food price increases and volatility. The elimination of export bans could be beneficial for domestic food markets since export bans tend to inhibit domestic production response, which could potentially exacerbate domestic supply problems. Harmful import tariffs and non-tariff trade barriers should also be eliminated. A quick and favourable completion of the World Trade Organization (WTO) Doha Round is argued by a recent study to be essential to reduce the risk of the implementation of destabilising policies on world food markets by reducing the bound level of current commitments.

- **A global, emergency, physical, grain reserve** to address food price crises. Such a reserve should be owned and managed by an institution such as the World Food Programme (WFP), which already has a global food management system in place including a strong logistical capability. The reserve should be created through donations of grain stocks from large food exporters, such as the US, Canada, and France, and large food producers such as China and India. This emergency reserve should be strategically positioned in these large food producing countries and, more importantly, in food importing poor countries, such as Bangladesh and the countries in the Horn of Africa, for easy and fast access. The operating costs of such a system needs to be acceptably low, and moral hazard problems that may prevent effective functioning of the system need to be overcome. Thus, the global emergency reserve should be started on an experimental scale. This process is already under way to some extent; the ASEAN+3 emergency rice reserve, currently under discussion, is an example. However, efforts in this regard are uneven across regions and there is not yet a coherent road map for a more comprehensive system of grain reserves.
- **Policies and investments** to promote agricultural growth, in particular smallholder productivity, in the face of climate change. Public policy should ensure that small farmers have opportunities to increase their productivity and income. Investments by national governments as well as global and regional institutions should focus on improved smallholder access to inputs such as seeds and fertilizer, through lower transport and marketing costs, improved market infrastructure, and greater competition as well as financial and extension services and weather-based crop insurance. New agricultural technologies suitable for smallholders should also be strongly promoted through increased investment in crop breeding and livestock research, and rural infrastructure should be strengthened to increase access to markets.

Since climate change has significant implications for agricultural productivity and human welfare, it is important for national governments to invest in climate change adaptation and mitigation using the full potential that agriculture offers. In the area of adaptation, these include investments in improved land management, adjustment of planting dates, and introduction of new crop varieties, while in the area of mitigation, investments include improved energy efficiency and crop yields, and land management techniques to increase carbon storage. IFPRI research shows that at least US$7 billion additional agricultural productivity investments would be needed annually to raise calorie consumption and prevent the adverse effects of climate change on human health and well-being.

A great deal of political will and commitment is needed in this area, particularly from national governments. It is thus important that climate change adaptation through agriculture is brought to the forefront of the international climate negotiation process in order to catalyse action.

- **An international working group** to regularly monitor the world food situation in a co-ordinated, transparent and timely fashion, and to trigger action in times of food situation anomalies in order to prevent excessive price volatility. While several working groups already exist, there is still a lack of cohesion in efforts to respond to food price volatility. This proposed working group should be made up of key institutions, such as the FAO, IFPRI, the International Fund of Agricultural Development, OECD, the United Nations Conference on Trade and Development, the World Bank, WFP, and WTO. The working group, in close collaboration with other major stakeholders, should pay close attention to food production, consumption (including for biofuels), trade, stocks, prices, and policies, as well as energy prices, input prices, and financial market speculation. The group could also provide guidance on the optimal level of grain reserves to be held for food security emergencies, when and how to release them, and at what prices.

Shenggen Fan is Director General of the IFPRI. Shenggen Fan was appointed director general of the IFPRI in December 2009. Shenggen has conducted extensive research on pro-poor development strategies in developing countries in Africa, Asia, and the Middle East. His work has helped identify which kinds of public spending are most effective in reducing poverty and generating agricultural growth.

Tolulope Olofinbiyi, a Nigeria national is a Research Analyst in the Director General's Office. She currently supports the Director General in research and outreach. She has an extensive background working in the agribusiness sector in Nigeria.

The **International Food Policy Research Institute** (IFPRI) seeks sustainable solutions for ending hunger and poverty. IFPRI is one of 15 centres supported by the Consultative Group on International Agricultural Research (CGIAR), an alliance of 64 governments, private foundations, and international and regional organisations.

IFPRI Headquarters, 2033 K St, NW, Washington, DC 20006-1002, USA
Tel: +1 202 862 5600 | Fax: +1 202 467 4439
Email: ifpri@cgiar.org; s.fan@cgiar.org | Web: www.ifpri.org

Engaging the market to reduce land-based emissions

By **Toby Janson-Smith**, Senior Director, Climate and Land Use: Markets and Policy, Conservation International (CI)

© CI/John Buchanan

Forest clearing for palm oil plantations in Indonesia is a major source of global emissions.

We cannot solve the climate crisis without changing the way forests and other lands are valued and used around the world, and the private sector must play a critical role in driving this transformation. The key lies in shifting to a new sustainable development paradigm that fundamentally values and conserves the natural capital and ecosystems upon which human well-being depends – a true green economic model. The author describes some promising initiatives and new market responses.

QUANTIFYING NATURE'S VALUE

Tropical forests continue to be cleared at the alarming rate of 14 million hectares annually, contributing about 16 per cent of global greenhouse gas emissions – more than the entire transport sector. Effectively tackling this problem would pay huge dividends. In fact, protecting and restoring these forests, along with the sustainable management of forest and agricultural lands, could contribute more than a third of the emission reductions needed through 2020. But there is a long way to go!

To help close the gap, and armed with its mission to conserve nature's assets for the well-being of humanity, CI is working with governments, the private sector and other partners to establish effective, scalable market mechanisms and demonstration models for conserving the ecosystems that underpin healthy, sustainable economies.

The economic value of ecosystems and the services they provide (including climate regulation, water conservation, soil production and pollination) is staggering – some estimates put it somewhere between the entire US and global GDP. Government and industry leaders are increasingly recognising that new development and business paradigms must be created and supported if the natural capital that provides these valuable services is to be maintained.

REDUCING EMISSIONS THROUGH SUSTAINABLE SUPPLY CHAINS

Tropical deforestation is being driven by the resource needs of a growing global population. Addressing such threats will not be easy with two billion more people being added to the middle class over the next 40 years – along with a doubling in demand for food, water and energy. Isolated solutions that ignore the connections between these human needs and land-use change are unlikely to be successful at scale and over the long term.

Fortunately, corporate leaders are realising that the sustainability of their supply chains, not to mention the economies upon which their businesses depend, can best be supported by considering the broader impacts and benefits of sustainable land management that conserves and restores natural capital instead of depleting it.

> **"The economic value of ecosystems and the services they provide is staggering."**

A growing number of companies are insisting that the key commodities they buy – such as palm oil, soy, beef and timber – are produced sustainably and without associated forest loss. For example, Walmart is requiring that by 2015 all palm oil in its branded products be sustainably sourced. For their US and UK products alone, this move should cut five million tonnes of greenhouse gas emissions over the next few years. Furthermore, recognising that about 60 per cent of deforestation in the Brazilian Amazon is related to cattle ranching expansion, Walmart will make sure that any beef it buys does not contribute to such land-use change.

Industry groups are also coming together to tackle these issues. At the UN climate conference in Cancun last year, the Consumer Goods Forum – a CEO-led organisation of hundreds of the largest consumer goods manufacturers and retailers – committed to mobilising its collective resources to help achieve zero net deforestation by 2020. At CI we're working with these industry leaders to put their commitments

into practice and establish demonstration models that can be scaled up and replicated around the world.

For example, CI and Starbucks are working together in Mexico and Indonesia to develop new frameworks and opportunities for providing carbon market access to smallholder farmers who produce coffee in ways that conserve and restore native forests. Such carbon revenue streams would improve farmer livelihoods and diversify their income sources, while incentivising farming practices that are friendly to climate and biodiversity – good for the environment as well as for maintaining high quality coffee supplies.

Another area where great progress is being made is through sustainable commodity certification schemes. CI co-chairs the Greenhouse Gas Working Group for the Roundtable on Sustainable Palm Oil, and is working with buyers and producers to reduce the environmental and climate impacts of the industry, which has been a major driver of deforestation, particularly in Asia. More work needs to be done, especially to support smallholder farmers seeking to make the shift to sustainable practices.

POLICY INCENTIVES

In addition to positively leveraging market forces and the power of supply chain commitments, it is also necessary to create policy frameworks and incentive mechanisms to pay for the carbon values in standing forests. It is likely that market-based approaches will be essential to complement public funds and effectively mobilise the tens of billions of dollars needed annually to tackle forest loss at a global scale.

Reducing emissions from deforestation and forest degradation, along with tree planting and sustainable forest management (collectively referred to as REDD+) is seen by many as one of the most important and underutilised tools in our fight against climate change. While REDD+ discussions have made steady progress within the UNFCCC negotiations, the uncertainty over the timing of a global climate deal means we must look to other pathways for advancing these activities, at least in the near term.

CORPORATE CLIMATE LEADERSHIP

REDD+ can play a valuable role in complementing internal emissions reductions to achieve aggressive (often carbon neutral) corporate climate leadership goals. CI has partnered with companies such as the Walt Disney Company and Dell to develop REDD+ demonstration projects in Latin America and Africa, collectively conserving more than a million hectares of threatened forests while generating impressive benefits for local communities. Such REDD+ investments can make good business sense by, for example, allowing companies to address multiple socially responsible objectives (e.g. poverty alleviation, fresh water access, biodiversity conservation); engage customers and employees around the climate issue with compelling, place-based stories; and enhance relations with host governments, communities and other local stakeholders in countries important from an operations or market perspective.

Researchers tracking bonobo apes in Democratic Republic of Congo's Tayna Reserve – protected through Disney's REDD support.

Fortunately, there are a number of efforts around the world that are helping to prove out various models for reducing forest emissions and providing valuable lessons to inform the development of emerging climate policy regimes, including the UNFCCC.

One promising example is taking place at the subnational level, where California is partnering with the Brazilian and Mexican states of Acre and Chiapas to establish the world's first REDD+ compliance market – expected to be worth about a billion dollars over the next eight years. California has taken bold leadership steps in capping its emissions while taking advantage of flexible mechanisms, including international forest conservation actions, to reduce economic burdens while maximising co-benefits. As a member of the REDD Offset Workgroup, CI is advising California on its REDD+ policy design. CI is also building on its 17-year field presence in Chiapas to help the state develop and implement its climate change action plan for generating verifiable emissions reductions.

REDD+ STANDARDS SETTING

Robust compliance and voluntary markets are underpinned by standards that generate high quality marketable assets around which investor confidence is built. With this in mind, CI has played a leadership role in helping to establish the world's pre-eminent forest carbon standards, specifically the Verified Carbon Standard (VCS) and the Climate, Community and Biodiversity (CCB) Standards.

The emergence of groundbreaking VCS forest carbon accounting methodologies and its buffer approach allowing the issuance of permanent credits have been major contributors to the rapid growth of REDD+ within the voluntary carbon market – driving the sector's market share from one per cent to 29 per cent over the past three years.

Climate-friendly coffee farming in Chiapas, Mexico supported through CI-Starbucks partnership.

But REDD+ is much more than just about the carbon. Intact native forests are home to many of the world's most threatened and rare plants and animals, and support the livelihoods of millions of local subsistence communities by providing critical ecosystem services such as maintaining water supplies and soil productivity. Five years ago, CI worked with a group of leading NGOs and companies to found the Climate, Community and Biodiversity Alliance (CCBA) to create new tools for promoting forest carbon activities that maximise social and environmental co-benefits. The CCB Standards are now being used by the majority of REDD+ projects around the world – often driven by investors, who recognise the strong links between social and environmental outcomes and project and reputational performance.

Building on their successes at the project scale, the VCS and CCBA are now working with national and state governments to develop new carbon, social and environmental standards that can be applied to REDD+ policies and measures undertaken at the jurisdictional scale, and showing how projects can fit or 'nest' within such broader accounting frameworks. These emerging standards are already generating interest from donors and regulators looking to set up compliance markets for REDD+.

PUBLIC-PRIVATE PARTNERSHIPS AND GREEN ECONOMIES

Given that it may be years before a global climate deal can be agreed, how can the various leadership efforts, such as those mentioned above, be leveraged into a larger, cohesive whole that will enable governments and agencies to tackle tropical deforestation in the near term and at scale?

"The CCB Standards are now being used by the majority of REDD+ projects around the world."

It is important that the way societies value and use natural capital is fundamentally changed. To make this happen, clear demonstrations will be needed of how human well-being at the local and global levels depends upon, and is enhanced by, the critical services provided by healthy ecosystems. With this in mind, CI is supporting the efforts of a few pioneering governments to build healthy, sustainable economies and demonstrate their effectiveness for achieving local development objectives through wise land use decision-making and planning.

Moreover, in collaboration with the US Agency for International Development, CI is launching the Sustainable Landscape Partnership to catalyse investment in REDD+ activities and low-carbon enterprises concentrated in select landscapes in Indonesia. This innovative partnership model seeks to change business practices and land use policies, while strengthening community participation, as foundations to holistic district-level development plans. We expect to replicate this public-private model for supporting green development in other key geographies around the world.

Given the magnitude of the climate, ecosystem depletion and sustainable development challenges we face, governments, NGOs and the private sector must work together to develop and prove new economic and market models that enhance human well-being over the long term through the conservation of irreplaceable natural capital. The fate of our planet and future generations depends upon it.

Toby Janson-Smith leads Conservation International's Climate and Land Use: Markets and Policy program, which develops standards, shapes policies and creates model corporate partnerships that support multiple-benefit forest carbon activities. Toby has played a key role advancing REDD within US and California climate legislation, secured major REDD investment partnerships with the Walt Disney Company and Dell, and been instrumental in the development of the Verified Carbon Standard and Climate, Community & Biodiversity Standards. Toby co-edited the book 'Climate Change and Forests – Emerging Policy and Market Opportunities' published in by the Brookings Institute and Royal Institute of International Affairs.

Conservation International (CI) — Building upon a strong foundation of science, partnership and field demonstration, CI empowers societies to responsibly and sustainably care for nature, our global biodiversity, for the long term well-being of people. Founded in 1987, CI has headquarters in the Washington, DC area, and nearly 900 employees working in more than 30 countries on four continents, plus 1,000+ partners around the world.

Conservation International
2011 Crystal Drive, Suite 500, Arlington, VA 22202, USA
Tel: +1 703 341 2400 | Web: www.conservation.org
Twitter: @ConservationOrg
Facebook: www.facebook.com/conservation.intl

SCA c/o Life

Real value creation for people and nature

To deliver sustainable value you need to view sustainability as a multidimensional opportunity, involving economic, social and environmental concerns. You also need a framework that links the challenges of global sustainability to the creation of shareholder value. In SCA, sustainability is an integral part of our operations and strategy for growth and value creation.

Clearly stated targets, integration with business operations and innovation are some key success factors in SCA's sustainability initiatives. Our four sustainability targets are an essential element of the strategy, targeting the areas we have identified as being important for the business in the long term: CO_2 emissions reduction, waste water management, responsible sourcing of raw materials and Code of Conduct compliance.

SCA has worked proactively for several years to reduce emissions from fossil fuels. We set up our first CO_2 emissions target as early as 2001. We have accomplished much since then, including the systematic replacement of coal and oil with biofuels and natural gas.

In 2008, the next step was taken with the introduction of a new, quantified CO_2 emissions target: through to 2020, emissions from fossil fuels will be reduced by 20 per cent, using 2005 as a reference year. The CO_2 emissions target means that SCA not only assumes responsibility for its own use of fossil fuels, but also for how electricity purchased by the group is generated. At year-end 2010, CO_2 emissions had declined by 4.2 per cent relative to the production level.

We combat climate change and minimise our carbon dioxide impact on the environment through a combination of new innovations and technologies, efficiency gains, consumer initiatives and carbon sequestering in our forests. SCA mills use substantial amounts of electricity. While most of it comes from electric grids, about one-quarter of electricity used at our mills comes from on-site generation. Investment in on-site combustion plants, while expensive, yields great improvement in energy savings and emissions reduction. Additionally, these new plants are often able to burn production waste as fuel, amplifying their environmental value.

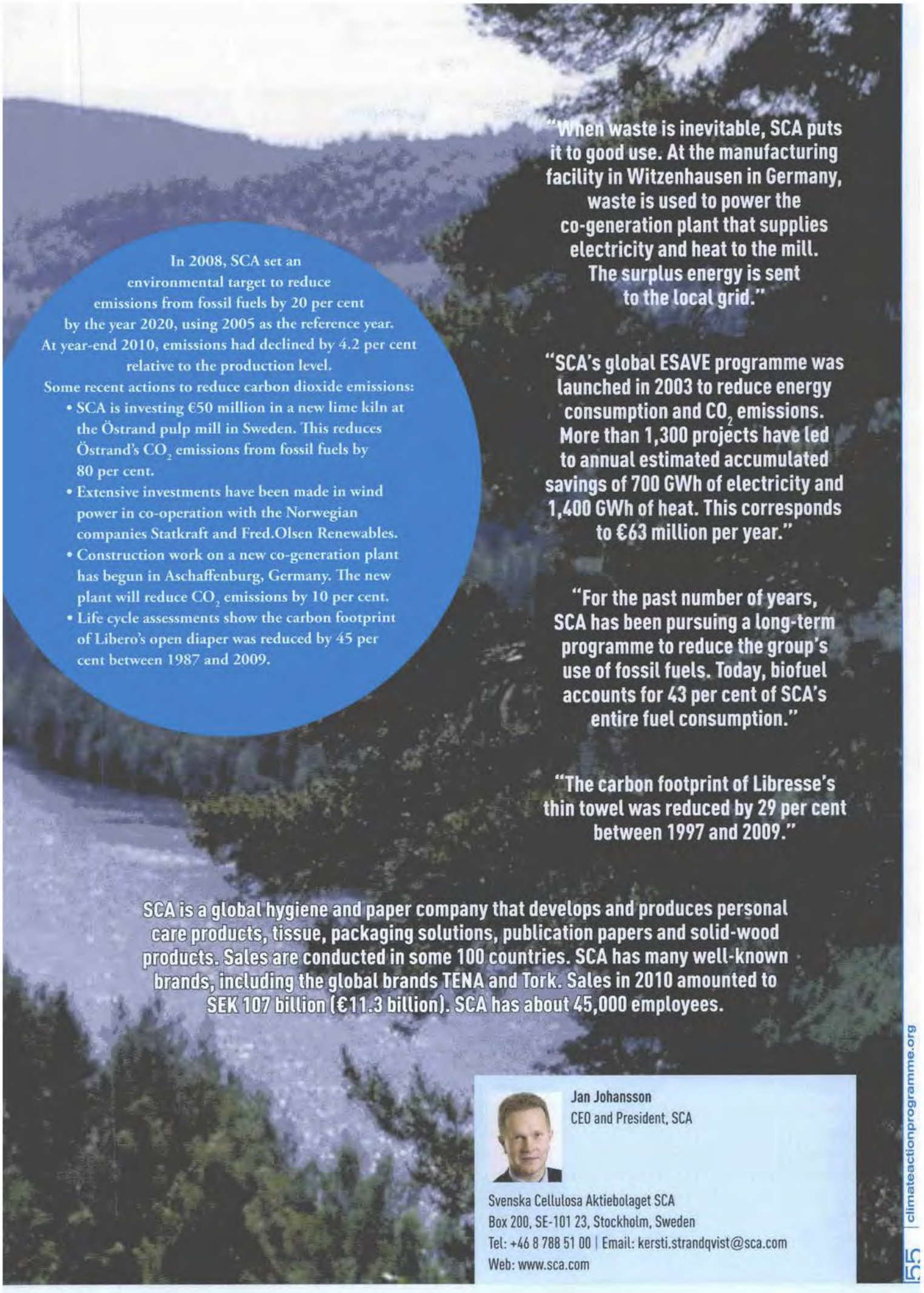
SCA is increasingly using biofuel in its production. By the end of 2011, SCA will inaugurate a new lime kiln at its Östrand pulp mill in Sweden. The new kiln will be powered with fuel pellets from SCA BioNorr and replace two oil-fired kilns. The investment will cut Östrand's CO_2 emissions by 80 per cent.

SCA's hygiene products have continuously developed from a user perspective, at the same time as their environmental footprint has been reduced. Improved material and improved fit makes our personal care hygiene products drier and more comfortable. Better products and the use of less material lead to lower consumption and less waste, and thus a smaller environmental footprint. More compact packaging and thinner products also result in environmental improvements since transport is reduced.

SCA's presence in society generates many positive effects through our business operations themselves and also the company's strong tradition of corporate sustainability and social responsibility. This involvement ensures our relevance in society and, in particular, helps to generate good business and thereby value for all our stakeholders, including customers, shareholders and employees.

"SCA is Europe's largest private forest owner with 2.6 million hectares of forest land. In net results, the total CO_2 emissions output from all our manufacturing worldwide is matched by the net absorption of CO_2. Still, we actively pursue reductions in CO_2 emissions."

"SCA invests heavily in wind power. Two major ongoing projects have the capacity to produce 4.6 TWh of wind power electricity annually."



In 2008, SCA set an environmental target to reduce emissions from fossil fuels by 20 per cent by the year 2020, using 2005 as the reference year. At year-end 2010, emissions had declined by 4.2 per cent relative to the production level.

Some recent actions to reduce carbon dioxide emissions:

- SCA is investing €50 million in a new lime kiln at the Östrand pulp mill in Sweden. This reduces Östrand's CO_2 emissions from fossil fuels by 80 per cent.
- Extensive investments have been made in wind power in co-operation with the Norwegian companies Statkraft and Fred.Olsen Renewables.
- Construction work on a new co-generation plant has begun in Aschaffenburg, Germany. The new plant will reduce CO_2 emissions by 10 per cent.
- Life cycle assessments show the carbon footprint of Libero's open diaper was reduced by 45 per cent between 1987 and 2009.

"When waste is inevitable, SCA puts it to good use. At the manufacturing facility in Witzenhausen in Germany, waste is used to power the co-generation plant that supplies electricity and heat to the mill. The surplus energy is sent to the local grid."

"SCA's global ESAVE programme was launched in 2003 to reduce energy consumption and CO_2 emissions. More than 1,300 projects have led to annual estimated accumulated savings of 700 GWh of electricity and 1,400 GWh of heat. This corresponds to €63 million per year."

"For the past number of years, SCA has been pursuing a long-term programme to reduce the group's use of fossil fuels. Today, biofuel accounts for 43 per cent of SCA's entire fuel consumption."

"The carbon footprint of Libresse's thin towel was reduced by 29 per cent between 1997 and 2009."

SCA is a global hygiene and paper company that develops and produces personal care products, tissue, packaging solutions, publication papers and solid-wood products. Sales are conducted in some 100 countries. SCA has many well-known brands, including the global brands TENA and Tork. Sales in 2010 amounted to SEK 107 billion (€11.3 billion). SCA has about 45,000 employees.

Jan Johansson
CEO and President, SCA

Svenska Cellulosa Aktiebolaget SCA
Box 200, SE-101 23, Stockholm, Sweden
Tel: +46 8 788 51 00 | Email: kersti.strandqvist@sca.com
Web: www.sca.com

Advancing the climate regime: pathways forward from Copenhagen

© Martin Pettitt

How can we close the 'gigaton gap'?

By **Jennifer Morgan**, Director, Climate and Energy Program, World Resources Institute (WRI)

The 2009 Copenhagen Conference of the Parties (COP) has gone down in history with a range of views on whether it was a complete disaster or a great success. The 'truth' is probably somewhere in the middle – progress was made on a number of topics, but the opportunity provided by Copenhagen's heads-of-state engagement was certainly not grasped to its fullest. Immediately after Copenhagen, time and momentum were lost, distrust dominated, and progress was hard to come by. The 2010 Cancun meeting helped improve on some of those factors. Decisions were taken to operationalise the Copenhagen Accord and elements of the Bali Action Plan. A good amount of trust was restored among the parties. The UNFCCC showed that it remains central to the international climate change debate, the forum where obligations are negotiated. We are still, however, far from what is needed to seriously address the risk of climate change and adapt to its impacts.

Countries have vastly different visions for what role the UNFCCC should play in tackling the climate change problem. Should it shift to a more 'bottom up' approach where countries drive action in an international framework, or is a more legally binding treaty the driver of action? What types of commitments, legally binding or not, should major players like China take on? COP17 in Durban presents an opportunity to bank on what Cancun delivered, but also to bring renewed urgency and clarity into the process, so that the goal of holding the temperature increase to 1.5-2°C, as well as appropriately comprehensive, ambitious, and legally binding commitments, do not move beyond our reach.

While it is possible to imagine technically how progress can be achieved, the political dynamics are more than tricky.

KEY ISSUES TO WATCH

GETTING CLARITY ON TARGETS AND ACTIONS

In Copenhagen many countries put forward 'pledges' to reduce greenhouse gas (GHG) emissions or take specific actions to address climate change. (WRI has kept track of these pledges over time; see Website 1 listed below at the end of this article.) These pledges were formally included in the Cancun Agreements in December 2010 and cover a wide range of targets and actions. Developed countries put forward national absolute targets while developing countries put forward various types of actions such as climate intensity targets, energy intensity targets, sectoral actions, and climate neutrality goals (see Website 2 below).

Many would note that one of Copenhagen's major outcomes was this series of pledges, something widely thought impossible just two years before. Others, however, were dismayed by two factors: first, that the pledges were not jointly negotiated but rather were put forward independently by each country stating what it could 'commit to'; and second, according to the UNEP *Emissions Gap Report*, the pledges are not ambitious enough to keep global average temperature increase below 2°C compared to pre-industrial levels, the long-term goal decided upon by the parties in the Cancun Agreements. In fact, according to the report the shortfall is rather large – a factor of 5 gigatons if the pledges are fully implemented – the so-called 'gigaton gap'.

The pledges remain, however, the core of the GHG mitigation debate in the negotiations. One key issue is the call by many for further clarity on what each pledge contains, as there is currently little information available on many of the underlying assumptions (see Website 3 below). In response, proposals have been put forward to create templates for reporting pledges in a consistent fashion so that they can be clearly understood and updated regularly to capture any changes.

A second key issue is how the pledges can be strengthened over time to close the 'gigaton gap'. Within the UNFCCC there are some discussions about adding new gases, increasing the sectors covered (for instance, aviation and maritime), and creating robust accounting rules to avoid double counting. Some countries, such as the European Union, have an active debate of increasing its pledge from a 20 per cent to a 30 per cent reduction below 1990 by 2020. Australia also has put forward a range.

The mitigation debate is one core example of where some countries like the US are looking for more of a pledge-and-review system, with greater national flexibility, to be created for the long-term regime, while others, especially developing countries and the European Union, are seeking greater international guidance and rules. Is there a middle way or is this a clash in the making?

BRINGING NEW INSTITUTIONS, PROCESSES, AND NETWORKS TO LIFE

The Cancun Agreements establish a wide set of new institutions, processes, and networks designed to address aspects of the climate challenge. There are ongoing negotiations around deciding a set of rules and guidelines for each and getting them up and running. One can cluster these new initiatives around transparency, finance, technology, adaptation, and carbon markets.

Transparency. The Cancun Agreements include a number of steps to enhance measurement, reporting, and verification (MRV) systems for developed countries around mitigation, technology, and finance. Along with submitting annual inventories, countries should also submit biennial reports on progress toward achieving targets. In addition, an international assessment of developed country targets is included to enable comparison of countries' implementation progress and build confidence that targets are being met. Some countries are also inquiring about compliance measures.

Developing countries also agreed to increase transparency around actions, agreeing to provide national communications every four years as well as biennial reports "including inventories … on mitigation actions and their effects, and support received". One key issue for developing countries is building the capacity and receiving the support to prepare such reports. There will also be increased transparency around a review of developing country actions, with both national and international MRV procedures under negotiation.

Finance. In addition to the very important issues around delivery of short-term and long-term finance pledged in Copenhagen, new institutions are set to be operationalised in Durban, including the launch of a new Green Climate Fund. Indeed, for many parties, establishment of this fund was one of the major outcomes of Cancun. A Transitional Committee made up of developed and developing countries is in the process of negotiating various details, including institutional make-up and functioning of the fund. Getting the fund up and running, as well as a Standing Committee to enhance the COP's ability to oversee the fund, is very important to many countries.

Here one can imagine that the technical details are easier to manage than the political and economic ones. WRI has been tracking the fast-start finance pledges (see Website 4), but these only go to 2012. Many developing countries are worried that the pledge in Copenhagen to deliver US$100 billion by 2020 is moving out of reach while developed countries struggle domestically with the economic crisis. How the long-term finance issues sort themselves out in Durban will be incredibly challenging.

Technology. The Cancun Agreements also established a Technology Mechanism, which was a high priority for developing countries. The Mechanism has two components: a Technology Executive Committee (TEC) and a Climate Technology Centre and Network (CTCN). The primary function of the TEC, consisting of twenty experts, is to identify technology needs, recommend guidance on policies and program priorities, recommend actions to overcome barriers, and catalyse development and use of technology action plans in developing countries.

The CTCN will focus more on facilitating a 'network of networks' on all levels including existing technology organisations and initiatives. The modalities for the CTCN are under negotiation in the lead-up to Durban.

Adaptation. The Cancun Agreements established the Cancun Adaptation Framework and an associated Adaptation Committee, which together have elevated the importance of adaptation within the UNFCCC, and which should make possible a more coherent, action-oriented treatment of adaptation.

Africa is particularly vulnerable to climate change.

The Adaptation Framework identifies a broad set of priority areas for action by the parties. The Adaptation Committee will be responsible for reviewing parties' communications on adaptation action and support, in order to recommend further needed actions and to enhance synergies with institutions outside the UNFCCC. The Committee's modalities as well as its linkages with other institutions are still to be decided; these items will be addressed in Durban.

Africa is extremely vulnerable to climate change. If adaptation were ever to get greater attention and focus one would think a COP in Africa would be the moment. This is an important space to watch.

Carbon markets. In addition to negotiations under the Kyoto Protocol about the future of market mechanisms, there are ongoing talks about creating 'new market mechanisms' under the UNFCCC. For some, like the EU, these are new sectoral mechanisms, for others emissions trading, and for others, like Japan, offset programmes. As carbon markets

operate in Europe and are piloted in a number of developing countries such as China, it will be important to clarify the UNFCCC's role in setting standards and tracking credits. Is the regime going to be a set of bilateral schemes or are international rules and norms required?

ENSURING THE SCIENCE INFORMS THE DECISIONS

As noted above, it is very clear that the current pledges are not adequate to keep the world below a 2°C rise. In the past, the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports have informed decisions on the level of effort that countries are willing to take to avoid dangerous climate change. The Cancun Agreements include a periodic review from 2013-2015 which is tasked with both measuring progress against the long-term limit of 2°C, but also assessing whether a 1.5°C limit is more appropriate. This review will provide clarity on the level of ambition required, and enables countries and companies to plan accordingly.

GETTING CLARITY ON LEGAL FORM IN THE REGIME

The Bali Action Plan, which launched negotiations on many of the issues included in the Cancun Agreements, did not specify the legal form of the final agreement, calling only for an 'agreed outcome' to the negotiations. Legal form is one of the most contentious issues dividing the parties, and proposals are now on the table to create a path to a legally binding instrument by 2015, timed with the periodic review noted above. Again, here one sees very different visions for the future emerge.

> **"Proposals are now on the table to create a path to a legally binding instrument by 2015."**

Under the Long-term Cooperative Action (LCA) track, where the Cancun Agreements are being finalised, it remains an open question whether the substance noted above will be inserted into a new legally binding treaty, whether it will inform amendments to the current Convention, or whether it will remain as a series of non-binding decisions. Under the Kyoto track, similar issues of legal form arise. Will Kyoto Parties agree to incorporate their Cancun pledges as part of a legally binding second commitment period under the Kyoto Protocol? Or will the Kyoto Protocol also move forward to manage non-binding pledges and transition into a protocol of institutions such as the Clean Development Mechanism and the Adaptation Fund?

The two legal debates are of course linked. Whether parties like Europe and Australia move forward with legally binding commitments under the Kyoto Protocol depends on whether the USA, China, and other countries commit to make their pledges legally binding either now or in the future. The

Will Durban be a new dawn, or is the politics fundamentally irresolvable?

answer to these questions linked across the two negotiating tracks could either dominate the Durban meeting or quietly become yesterday's news.

MOVING ON FROM DURBAN

The work to address climate change will of course not stop in Durban. While a number of decisions are likely to make the Cancun Agreements more operational, the complexity of the issues will undoubtedly require further technical negotiations. In parallel, however, issues of ambition, equity, and legal form will remain. A Durban mandate or blueprint could decide a way forward on questions of legal form, which would be a good step in the right direction. The question is whether the politics are merely tricky or fundamentally irresolvable. For the climate's sake, we have to hope that countries can come together on that common vision and provide much needed clarity on the future of the climate regime.

Jennifer Morgan is Director of the Climate and Energy Program at the World Resources Institute. In this capacity, she oversees the Institute's work on climate change issues and guides WRI strategy in helping governments, businesses, and individuals take positive action toward achieving a low-carbon, climate-resilient future.

The **World Resources Institute** (WRI) is a global environmental think-tank that goes beyond research to put ideas into action. WRI's mission is to move human society in ways that protect the earth's environment and its capacity to provide for the needs and aspirations of current and future generations. The Institute works with governments, companies, and civil society to build solutions to urgent environmental challenges, focusing on four key programmatic areas: climate and energy, institutions and governance, markets and enterprise, and people and ecosystems.

World Resources Institute
10 G Street NE, Suite 800, Washington, DC 20002, USA
Tel: +1 202 729 7600 | Fax: +1 202 729 7610

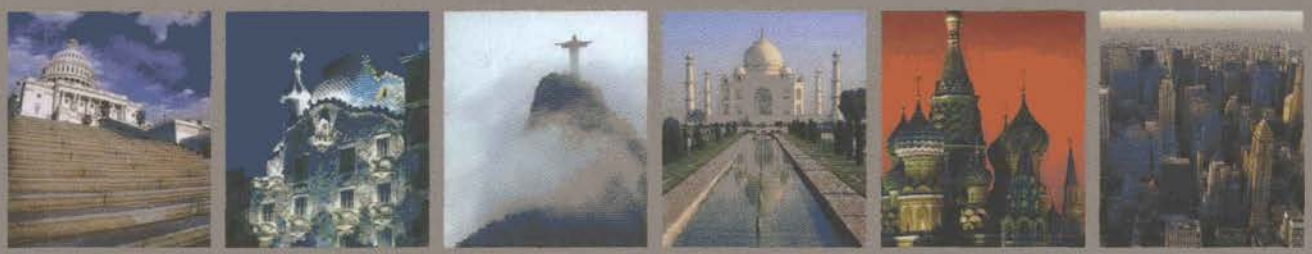
Website 1: www.wri.org/publication/comparability-of-annexi-emission-reduction-pledges
Website 2: http://pdf.wri.org/working_papers/ghg_framed_mitigation_actions_by_developing_countries.pdf
Website 3: www.wri.org/publication/remedying-discord-in-the-accord
Website 4: www.wri.org/publication/summary-of-developed-country-fast-start-climate-finance-pledges

Are you cut out for the global challenges of the next decade?
Ready to up your game?

Join the Georgetown-ESADE Global Executive MBA,
the MBA for Global Leaders.

Global Executive MBA

Washington, DC	Barcelona	Buenos Aires & São Paulo
Bangalore or Shanghai	Moscow & Madrid	New York City & Washington, DC



- Leverage the top talent from leading Business Schools in the US and Europe
- Acquire unparalleled exposure to emerging markets
- Experience six 12-day modules in 6 diverse countries over 14 months
- Benefit from the world's No.1 ranked, School of Foreign Service's expertise in international relations
- Achieve two MBA diplomas from Georgetown University and ESADE Business School
- Join a global alumni elite

Unlock your potential to shape the globe

Georgetown University
School of Business / School of Foreign Service

ESADE
Business School

Contact: Pollyanna Nethersole Tel: +34 934953843 Email: pn82@georgetown.edu

www.globalexecmba.com

If access to energy is achieved with environmentall sound technologies, it directly contributes to global environmental sustainability.

Off-grid renewable energy: an immediate solution to energy poverty

By **Simon Rolland**, Secretary General, Alliance for Rural Electrification (ARE)

According to the IEA, which has published the figures that are going to have authority in the energy access world for years to come, it was estimated that in 2008, 1.5 billion people, or 22 per cent of the world's population, had no access to electricity. Eighty-five per cent of these live in rural areas. Two regions in particular suffer this deprivation. Despite the efforts of the international community, the overall situation in Africa has got worse, mainly because of population growth that has outpaced the slight increases in electrification rates. Southern Asia, in spite of impressive progress (more than 200 million people got access during the last decade), still harbours the biggest group of unelectrified people in the world.

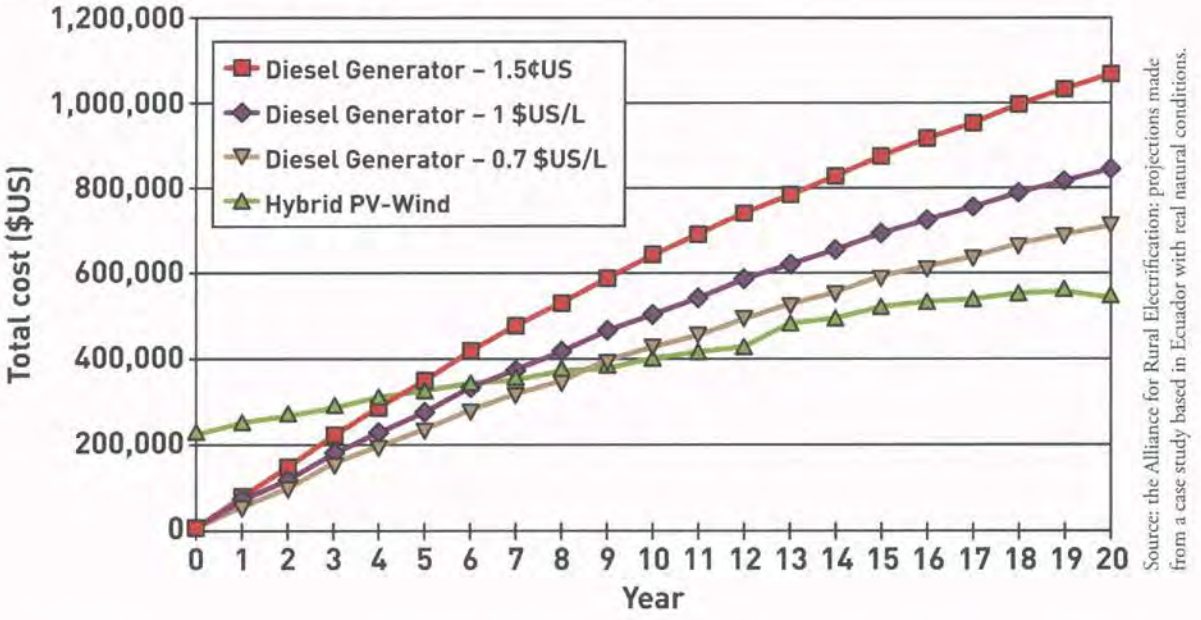
We can never be reminded too often of the role that energy, and more specifically electricity, plays in development. Energy alone is not sufficient to alleviate poverty, but it is certainly necessary and there will be no major development progress without a growing number of people gaining sustainable access. Energy poverty is the most 'horizontal' issue of all; energy access is not one of the Millennium Development Goals (MDGs), but a vital requirement for progress towards them. Access to modern energy helps to reduce hunger and facilitates access to safe drinking water through food preservation and pumping systems (MDG 1); It can improve education by providing light and communication tools (MDG 2); it can lead to more gender equality by relieving women of fuel and water collecting tasks (MDG 3); it contributes to the reduction of child and maternal mortality and the incidences of disease by enabling refrigeration of medication as well as access to modern equipment, and it helps fighting pandemics such as HIV (MDG 4, 5, 6). Finally, if access to energy is achieved with environmentally sound technologies, it directly contributes to global environmental sustainability (MDG 8).

RURAL ELECTRICITY PROVISION

There are three basic approaches to bringing electricity to remote areas. The first approach is simply to extend the national grid; however, this is at best a long-term hope in many countries. Often national utilities are already struggling with grid stabilisation, and concentrating on increasing generation capacity to match the demand of growing populations in the urban centres. Costly extensions to rural areas are a long way down the priorities (According to the World Bank/ESMAP, grid extension prices vary from US$6,340/km in a densely populated country such as Bangladesh to US$19,070/km in a country like Mali). Therefore, in many countries, the grid is not a viable option even in the medium or long term.

The second approach is based on off-grid technologies. The dispersed character of rural settlements is an ideal setting for these solutions in particular with renewable energy (RE) sources that are more competitive in remote communities, and help to reduce the power losses of long transmission

Figure 1. Cost comparisons of energy power systems on a lifecycle basis.



Source: the Alliance for Rural Electrification: projections made from a case study based in Ecuador with real natural conditions.

lines. In this framework, energy home systems (EHS), designed to power individual households and to provide an easily accessible, relatively cheap and easy to maintain solution, are a good alternative. The most known examples of EHS are the solar home systems (SHS), millions of which have been deployed around the world in the last decades. However, EHS provide electricity primarily for lighting and small appliances but cannot supply motive power.

The third approach is to build electricity mini-grids, which can provide centralised electricity generation at the local level to both domestic appliances and local businesses using village-wide distribution networks. These can be powered either by fossil fuel (diesel most of the time) or by RE. Diesel often remains the most used technology because of the persistent idea, often wrong, that it is the cheaper option. The reality shows that renewables present numerous competitive advantages, including cost.

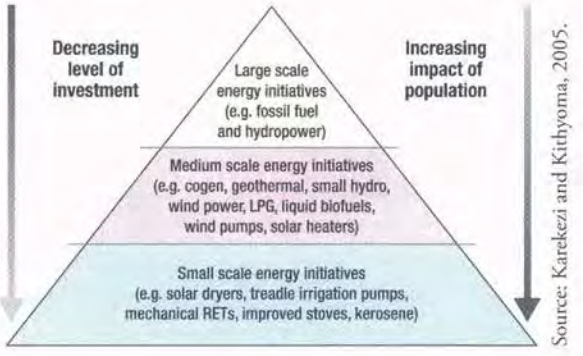
Systems running on diesel fuel have the theoretical advantage of being dispatchable on demand. However, in a rural context, the ability to run a generator set (genset) depends on the sheer availability of fuel, which is often a challenge in isolated areas. And the problem of availability and dependence on fuel goes, of course, beyond the community level. It is estimated that the recent (and continuing) rise in oil prices have cost an additional US$10.5 billion in oil imports to non-producing African countries, ten times more than their gains in debt relief. For this reason already, diesel gensets are a much less attractive option.

In addition, environmental impacts also have to be taken into consideration. Locally, gensets are noisy, polluting and have a direct health impact on users, especially when they are poorly installed and maintained; and globally they contribute to the environmental problems which are first striking developing countries. Of course it is impossible to ask countries rich in fossil fuels to renounce cheap energy; however, renewables represent a sustainable option for the countries deprived of these reserves, and an immediate solution for rural areas, even in countries rich in resources but where grid extensions are not an economical option. In brief, developing countries would be advised to broaden and diversify their energy mix, to look at sustainability and to integrate the particular requirements of rural areas.

However, it is undeniable that energy choices in developing countries are driven by the lowest cost options. And yet, renewables are emerging as cost competitive solutions, especially in isolated areas. Several technologies – mini-hydro, biomass, wind and photovoltaics (PV) – already offer the lowest 'levelised' generation costs for off-grid electrification, either alone or within a mini-grid, and also present an important potential for further technological advances with generation costs expected to continuously decline, whereas diesel is ultimately doomed to become more expensive. "Diesel-gensets are neither affordable nor sustainable, even with 100 per cent capital subsidies. On the other hand, diesel-PV-hybrid systems become more attractive, since they require lower tariffs and are less exposed to fuel price volatility. For a village (with a small load) a properly designed diesel-PV-hybrid system can offer an affordable tariff (with a limited support on the capital subsidy)" (from *Solar-diesel Hybrid Options for the Peruvian Amazon, Lessons Learned from Padre Cocha*, ESMAP Technical Paper, 2007, p. 26)

Even the commonly spread idea that RE only exists in developing countries thanks to subsidies is wrong. A large part of the EHS systems (especially the SHS) are paid for in cash, and some companies develop and operate even

Figure 2. The energy pyramid in Africa.



Source: Karekezi and Kithyoma, 2005.

bigger systems without any subsidies, for instance in Laos (Sunlabob) or The Gambia (NICE International). Of course public money and subsidies play a fundamental, and unavoidable, role in accelerating energy access and in supporting these systems, but it is worth mentioning that off-grid renewables are not only clean and sustainable, they are also economically sound.

Renewables represent the most local, flexible, adaptable, easy to scale up, to operate and to maintain sources of energy, capable of turning natural burdens (e.g. deserts) into opportunities. And they are available. The potential for RE in the regions where energy is the most needed is immense. Sub-Saharan Africa has tremendous natural advantages. Some experts estimate the continent's potential for power generation from renewables is more than 200,000 TWh/year, including more than 30,000 TWh/year rated as competitive in the short term. In Asia, some countries receive some of the highest solar irradiations in the world, whereas others already have important experience in wind, biomass or small hydro.

Finally, there is growing evidence that investment in small and medium scale renewable energy systems may have more impact in improving energy services for the majority of developing countries' population. Therefore, emphasis should be given to small and medium scale renewables more than any other.

HOW ARE WE TO TRANSFORM POTENTIAL INTO ECONOMIC SUCCESS?

So if renewables offer immediate cost-competitive solutions, especially for rural areas, why are they not more widespread?

First of all, in developing countries worldwide there is a problem of education and information about renewables, at every level. Governments still do not believe in RE technologies, banks do not understand the financial structures of RE projects and do not lend to them, even villagers sometimes consider these technologies to be second class. These educational and information barriers are the first ones to address on a large scale to support widespread deployment of RE. There is no lack of success stories and experience, hence powerful dissemination is key. In parallel, capacities of each stakeholder concerned need to be consolidated on topics such as project development, financing, operation and maintenance.

The second point is linked to the previous one: energy policies remain short-sighted in many countries, and without coherent strategy. "In most countries, policies and regulations currently tend to emphasise short-term costs and supply, rather than the long-term benefits of clean technologies" (Athena Ronquillo-Ballesteros, in the REN21 forum, www.ren21.net). Many countries keep focusing on grid extension, urban electrification or on large hydro, gas or coal power plants without any long-term strategy or with sustainability (including of supply) as primary concern. Such reasoning has high economic costs (power shortages, losses for the economic sector) and underlines the need for diversified electricity generation capacities especially in rural areas, where off-grid technologies can now bring reliable electricity. Suitable policies supporting RE projects are still rare and often not applied and, as in other economic sectors, uncertainties tend to delay projects, especially in a sector where investments need to be made over long periods of time.

RE off-grid and mini-grid methods often offer the most competitive solutions, but translating this potential into success remains challenging. The deployment of hybrid mini-grids, for instance, involves complex financial and organisational questions. The bottlenecks are not in the technologies, but in the financing, management, business models, sustainable operations and maintenance (O&M) and socio-economic conditions. However, here too, positive experiences exist and answers adapted to every situation can be formulated either with stand-alone solutions (e.g. SHS with micro-credit or fees for service) or mini-grids (e.g. different business models, capital subsidies and cost recovery tariffs etc.). Countries need to use this experience and must target the local economic growth that is the only way to ensure the revenue generation that will support the long term O&M of the power systems. Therefore a proactive approach regarding productive uses of electricity, especially, but not only, piggy-backed onto an existing developed network, should be encouraged as an integral part of any rural electrification programme.

More detail on these subjects can be found in *Renewable Energies for Africa: Potential, Markets and Strategies*, REN21, 2010 (www.ren21.net); and *Productive Uses of Electricity to Increase the Impact of Rural Electrification Programs* (2008) and other technical papers, ESMAP (www.esmap.org).

Simon Rolland is Secretary General of ARE. He has worked for ARE for the past five years. He is responsible for the policy sector and outreach of the association. ARE has become a pioneer in the field of sustainable development, and Simon an expert in the emerging off-grid markets in developing countries.

The **Alliance for Rural Electrification** (ARE) is the only international business association in the world focusing on the provision and the promotion of small scale renewable energy solutions for rural electrification in developing countries. ARE serves as an international platform for sharing the knowledge and experience of the private sector interested in operating in developing countries. Based on their experience, it develops technological, political and financial recommendations, which are made available for policy-makers and other actors in the field of rural electrification.

Alliance for Rural Electrification
Renewable Energy House, Rue d'Arlon 63-65
1040 Brussels, Belgium
Tel: +32 2 400 10 52 | Fax: +32 2 400 10 10
Email: s.rolland@ruralelec.org | Web: www.ruralelec.org

Investing in a green economy

By **Oliver Greenfield**, Convenor, Green Economy Coalition, and **Victor Anderson**, One Planet Economy Leader, WWF-UK

The vision of a green economy is no longer merely the stuff that dreams are made of. The transition is already under way. Governments across the developed and developing world are investing in renewable energy, low carbon infrastructure and new technologies. The challenge is to scale up the level of investment in time, and also to ensure that those investments generate a just transition and a more equitable society, both within and between countries. In the following article the authors have outlined the challenges, opportunities and solutions for scaling up financial investments in a green economy.

THE CHALLENGES

The movement of finance is the main factor determining how resources are allocated and reallocated in the world economy. Influencing the direction and allocation of those financial flows is therefore crucial to the transition to a green economy. However, the state of our global financial system presents a number of challenges for influencing financial flows. These include:

- The 'financialisation' of the world economy. A large proportion of the money in the world is tied up in trading for directly financial purposes (e.g. speculation on exchange rate movements, trading in commodities, derivatives), as distinct from trading in goods and services.
- The financial system crisis of 2008 exposed some huge weaknesses and fragilities embedded in our global economy. There is rightly a debate about the future of finance, both in many individual countries and in the world system as a whole (for example, the discussion about the Basel III proposals on banking reform).
- Public sector financial problems in many parts of the world make it difficult to persuade governments to increase expenditure to tackle problems such as climate change and ecosystem deterioration, or to find funds to stimulate green economic activity. There is a risk of political retreat; spending what little is available supporting the brown economy or setting targets on green growth without the means of achieving them, increasingly depending on the private sector to come up with the money, and perhaps most worrying of all – doing nothing and placing the burden of greening the economy on future generations.
- At this point it is worth remembering that the main conclusion of the *Stern Review* (2006) was that the benefits of strong, early action on climate change far outweigh the costs of not acting. According to the review, without action, the overall costs of climate change will be equivalent to losing at least 5 per cent of global GDP each year, now and for ever (a wider range of risks and impacts could increase this to 20 per cent of GDP or more). In June 2008, Stern increased the estimate for the annual cost of achieving stabilisation between 500 and 550 ppm CO_2 to 2 per cent of GDP to account for faster than expected climate change.
- In the absence of government leadership, the private sector appears unwilling to provide finance for creating new markets, or bringing new green products and services to markets in the volumes needed when existing high carbon industries are still bringing in the profits and providing jobs.
- Meanwhile the climate, ecosystem, and other problems requiring finance, continue to worsen, with the resources required to deal with these problems not being available. The consequences of this degradation, such as increasingly volatile weather conditions, are arguably already feeding through into an already stressed economic system – most notably through commodity price rises. These rises are affecting the ability of countries to grow their economies or worse, adequately feed their people.

THE OPPORTUNITIES

It is increasingly clear we are entering a prolonged crisis, with no clear economic vision or leadership, and still

overly dependent on the institutions and thinking that brought us the problems. Against this rather bleak picture, the Green Economy Coalition offers an alternative vision: a green economy that delivers prosperity for all within one planet limits.

For us the green economy has two transformative ideas:

- It is an economy that restores and protects the natural world.
- It is an economy that explicitly pursues well-being for all.

In order to meet this vision of an economy that better meets the needs of people and of the planet, we have identified five themes for change, all of which are critical for accelerating the transition. For example, any policy aimed at directing financial flows in order to green economic sectors and reduce environmental impact, will also need to consider its impact on society within a broader economic governance framework.

Greening high-impact sectors. We know that food, housing, transport, energy, cities and infrastructure create between them 70-80 per cent of environmental impacts. Therefore, investing in greening these sectors is critical for a green economy.

Improving societal well-being – investing in people. More social dialogue enables greater societal representation in economic governance. Policies for a green economy must take distribution and equity considerations into account and help to build the capacity of civil society to engage.

Managing natural capital – investing in natural systems. A green economy develops the ability to help manage 'natural capital', investing and building governance and sustainable markets for ecosystems services and resources.

Influencing financial flows. We know that the changes in our economic sectors and improvements in our natural system management will require changes in financial flows, new private sector markets and investment, subsidy reform, taxation reform, and public sector financing.

Improving governance and measurement. The transformative component of this agenda appears to be redefining the purpose of our economy so that it is explicitly about making 'prosperity for all within one planet's limits'. This means setting new measures of economic performance, such as well-being and ecological efficiency alongside measures of GDP.

THE SOLUTIONS

Reform of price signals. The price mechanism is central to the market economy, and key to determining the flows of finance. In many cases, prices provide accurate and necessary signals, which can usefully influence decisions in the world economy. However, there are numerous instances in which prices fail to provide the market with the necessary signals and incentives. This is a crucial underlying factor in the current pressures on the global atmosphere – both of which are often regarded as free goods no-one need pay for.

The lack of proper payments systems for the atmosphere and most ecosystems creates a situation in which companies and investors have little incentive to invest in the crucial underpinnings of the world green economy.

World governments have a major influence on prices, and market transactions, in their national contexts. There is a need now to reform two of those influences – taxation and subsidies. Policies for consideration include the following:

- Tax the unsustainable sourcing of commodities, such as timber, palm oil, and soy. This could be combined with increased support for reliable sustainability certification schemes.
- Phase out environmentally harmful government subsidies, for example on fossil fuels.
- Introduce procedures to carry out carbon and biodiversity impact analyses of government spending options.
- Bring in environmental and resource-efficiency tax measures.
- Introduce new subsidies to encourage the uptake of renewable energy – such as feed-in-tariffs.

Creation of new investment funds. If they have not done so already, governments should introduce green investment banks to help fund their national transitions to a green economy. These would invest principally in combating ecosystem deterioration and climate change, and stimulating new green industries and essential sectors in food, housing, transport and energy, and in the process creating many thousands of new green jobs.

> **“Governments should introduce green investment banks to help fund their national transitions to a green economy.”**

These funds should not only operate in partnership with the private sector, providing additional funding where necessary, but also with key stakeholders from civil society who provide a critical perspective on the implications of investments on a societal and environmental level.

New sources of funding. Negotiations about setting up a Global Green Fund to combat climate change have been protracted and difficult. Against this background it may be difficult to open up the possibility of expanding the remit of the Fund to include investment in, and the incentivising of, maintaining and restoring ecosystems. Alternatively, finance for ecosystems might be better dealt with by a separate fund.

The key issue in all this, however, is mobilising new sources of finance. The world community needs to ensure that finance secures the future of the atmosphere, major ecosystems and the money for what we call 'managing natural capital' and new investment for 'greening economic sectors' – particularly food, housing, transport, energy and infrastructure.

This depends on redirecting finance away from where it is less usefully spent:

- A financial transactions tax could be introduced, to redirect some of the profits from currency speculation, which is to a large extent an unproductive part of the world economy.
- There could be an end to the Chicago Agreement not to tax aircraft fuel for international flights, and its replacement by an international agreement to tax carbon emissions from aircraft, with the proceeds being used to help fund transition to a green economy.
- Similarly, there could be an agreement to tax emissions from international shipping.
- Economic sanctions could be introduced against tax havens, with some of the benefits from reducing tax avoidance going to fund green economy transition.
- An international tax could be introduced to penalise governments whose countries exceed agreed greenhouse gas emissions levels.
- Any system of payment for ecosystem services, or investment in ecosystem services, should be designed to raise revenue broadly from those who benefit from those services. This would create a vital flow of funding to countries where most of the benefits from their ecosystems go to people and companies outside, such as rainforests countries, which are major assets for the world community.

It is important not to accept the excuse that "there is no money left" – the point is that it is being spent for the wrong purposes.

Role of existing international institutions. The world's major international economic and financial institutions are outside the comparative democracy of the UN system. However, if we are serious about the transition to a green economy, the International Monetary Fund (IMF), the World Bank, the World Trade Organization (WTO) and the G20 must play their part in that process. The question of green economy investment and the question of governance are inseparable. President Sarkozy has asked David Cameron to prepare a paper on global governance for the G20 summit in November 2011. The Cameron governance paper could address the question of the governance and policies of the IMF, World Bank, and WTO, as key parts of the global economic system, and their role in investing in a green economy.

There is an opportunity for government ministers to encourage the G20, through the Cameron governance paper, to tackle the lack of green economy investment strategy of the IMF, World Bank and WTO, and the G20 itself. Further, the world Finance Ministers could use their influence within these institutions directly to promote the aims of a green economy.

In particular, we need to see a thorough review of World Bank financing policies, with the aim of shifting resources away from some physical infrastructure projects (e.g. dams and some road schemes) and towards investing in maintaining and restoring ecosystems, and in renewable energy and energy efficiency.

The Doha Round of WTO negotiations could be used to ensure that trade agreements are in line with multilateral environmental agreements and the general aim of transition to green economy, IMF lending policies could be reviewed to ensure that they do not push debtor countries into measures which accelerate the depletion of their natural resources and the deterioration of their ecosystems. Governance arrangements for all these bodies could be reformed in order to ensure that UNEP, or its successor body, is represented on their governing bodies.

WHAT CAN BE DONE TO HELP?

Investing in the transition to a green economy is a very large problem, especially at a time of economic volatility and cuts in government spending in many parts of the world. The difficulties involved are leading some people to argue that little can be achieved at a global level.

However, in contrast, it is important to recognise that if solutions are implemented at national levels then these economies will be more resilient to the growing challenges ahead.

Agreeing solutions to invest in the green economy is crucial to future national and international economic success. National governments, for their own economic security, should be strongly represented at the Rio 2012 Earth Summit, with clear positions on these green economy proposals.

The Green Economy Coalition would welcome an ongoing dialogue on how it can support policy makers in their work on these issues and their preparations for Rio 2012.

Oliver Greenfield is the Convenor of the GEC. Convenor is a carefully considered title to reflect network leadership, inviting people from diverse institutions and networks to work together, and enabling them to influence collectively. Prior to this role Oliver spent seven years leading WWF's Sustainable Business and Economics work.

Victor Anderson is the One Planet Economy Leader at WWF-UK, a programme about seeing the world economy and global environment as a single system. Victor has previously worked as an economist for the UK's Sustainable Development Commission. He has also published two books as well as numerous reviews and articles related to green issues, and lectured on Politics and Economics.

The **Green Economy Coalition** (GEC) is a diverse set of global organisations and sectors from NGOs, research institutes, UN organisations to trade unions. The Coalition's collective mission is to accelerate the global transition to a green economy.

Green Economy Coalition
International Institute for Environment and Development
3 Endsleigh Street, London, WC1H 0DD, UK
Email: oliver.greenfield@greeneconomycoalition.org
Web: www.greeneconomycoalition.org

Private capital for a sustainable future

In order to reach its targeted amount of US$100 billion, the GCF must effectively mobilise both capital and expertise from the private sector.

By **Paul Clements-Hunt**, Head of Unit, UNEP Finance Initiative

The Green Climate Fund (GCF) presents a major opportunity for catalysing low-carbon, climate-resilient development in developing countries, according to the private financial sector represented by UNEP Finance Initiative (UNEP FI). Through strategic deployment of its funds, the GCF could provide a vital stimulus to achieve, in developing countries, economic development and growth which is carbon-efficient and climate-resilient. In order to reach its targeted amount of US$100 billion, and to maximise its impact in addressing climate change, the GCF must effectively mobilise both capital and expertise from the private sector. To this end UNEP FI looks forward to a GCF that employs three facilities for dispersing its funds, and a toolbox of measures that will improve the risk-return profile of climate investments in developing countries – and therefore help to mobilise the essential finance.

THE GREEN CLIMATE FUND

The decisive battleground on climate change will be in emerging economies, where rocketing growth in energy demand will have to be met, while energy-related carbon emissions reduced. At the same time, it seems unequivocal that developing countries will be hit hardest by the physical impacts of a changing climate. If catastrophic climate change is to be avoided, and the unavoidable impacts made bearable for the most vulnerable communities, any future climate change regime must feature systematic support from the international community for low-carbon and climate-resilient development and prosperity in developing countries.

One notable achievement in the international climate negotiations is the establishment of a process towards the creation of a GCF which is expected to become the world's main financial instrument to enable and facilitate low-carbon and climate-resilient development in developing countries. The fund will seek to raise finance for adaptation and mitigation in developing countries, will leverage private sector investment, and will be charged with supporting projects, programmes, policies and other measures in developing countries. At the time of writing (October 2011), the details of the governance, objectives and operation of the GCF remain under discussion. The fund's operational aim and most pressing challenge at the moment consists in mobilising, and making the most effective use of, financial resources – at least US$100 billion for mitigation and adaptation activities in the developing world.

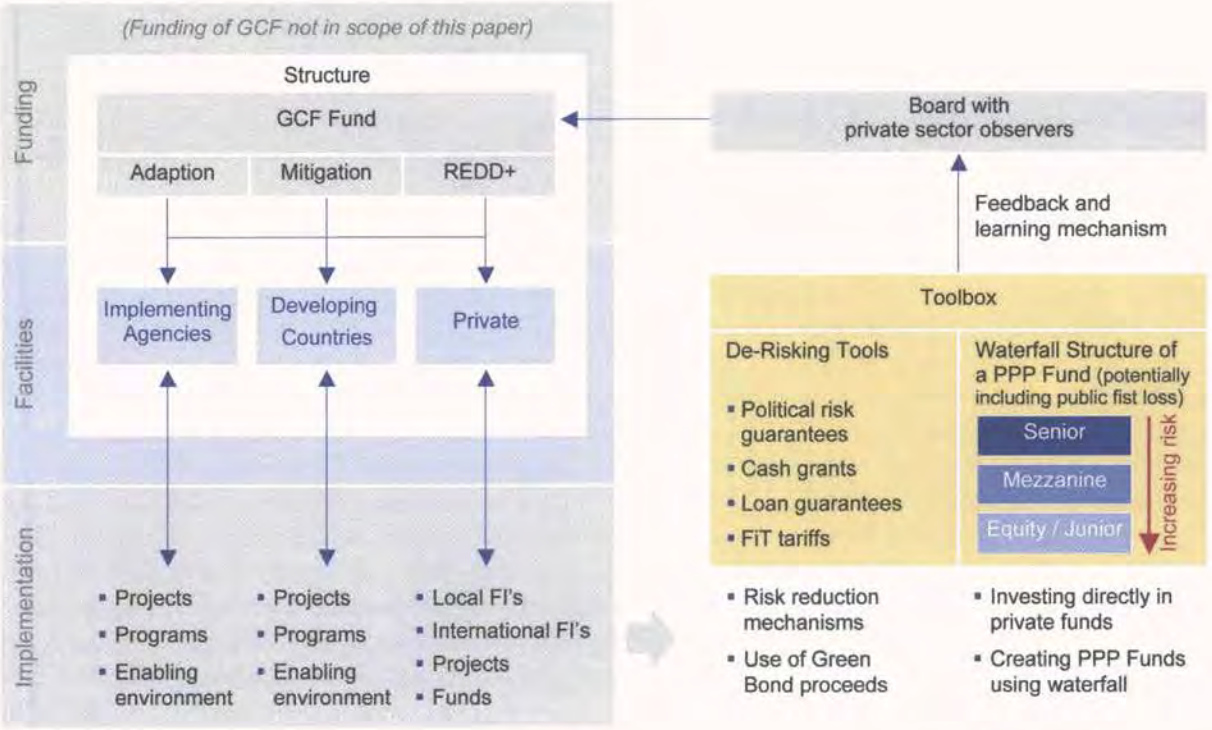
> **“Any future climate change regime must feature systematic support from the international community for low-carbon and climate-resilient development.”**

The task of designing the GCF was given to the Transitional Committee (TC), comprising 40 members with 14 representatives from developed country parties, and 25 from developing country parties. The TC is mandated to develop and recommend operational specifications for the GCF in time for approval by the 17th session of the Conference of the Parties (COP17) to the UNFCCC in Durban.

PRIVATE SECTOR HOPES FOR THE GCF

A stable and competitive risk-return profile of climate investments is a prerequisite to mobilising private sector capital. At an International Finance Roundtable hosted by Chatham House in August 2011, experts agreed that there is no lack of investment capital per se, contrary to common perception. Pools of funds are available, and currently are allocated in areas that financiers feel comfortable with. This reflects the fact that, ultimately, private capital flows depend on the risk exposure private investors are willing to take and are not only a function of capital availability.

Figure 1. Suggested structure of relationships with the GCF.



Source: Allianz, 2011.

The private financial sector represented by UNEP FI believes that the GCF presents a major opportunity for catalysing low-carbon, climate-resilient development in developing countries. In order to reach its targeted amount, and to maximise its impact in addressing climate change, the GCF must institutionally mobilise both the capital and the expertise of private finance.

In particular, UNEP FI sees the transformational potential of the GCF in how it deploys finance to public and private sectors, and proposes that the GCF should comprise a multi-access fund that serves as a distribution point for public monies in order to fully integrate the private sector into the GCF process. Further, a toolbox of risk-alleviating measures should be developed.

"The GCF must institutionally mobilise both the capital and the expertise of private finance."

A MULTI-ACCESS FUND

A key design feature of the GCF will be the three main facilities that act as windows of fund disbursement:

- The first facility will serve implementing agencies such as international financial institutions (IFIs), including development banks, as well as the UN and other international agencies to apply for funding at the programmatic and individual project level.
- The second facility will provide direct access for developing country governments.
- Third is a private sector facility to which the private sector can apply for fund investment, creation of public-private partnership funds, and projects that satisfy GCF criteria.

A particular priority for the three facilities will be to ensure that they are focused on currently under-serviced developing countries, with the aim of avoiding the crowding out of both private and public sources. Programmes and projects on the ground could be provided with debt capital and could be implemented by existing development banks.

A TOOLBOX OF OPTIONS

To minimise the conventional barriers, and particularly risks, faced by the private sector when investing in newer technologies in developing countries, the GCF can offer various de-risking tools. Four generic types of instrument have been identified to give a flavour of the range the GCF can provide.

Political risk reduction mechanisms. Private sector investors expect transparency, longevity and certainty (TLC), as discussed in the Deutsche Bank publication *Paying for Renewable Energy: TLC at the Right Price* (2009; www.dbadvisors.com), and a clearly defined, long-term investment horizon. If these prerequisites are not fulfilled, tailor-made risk reduction mechanisms need to be set up in order to ensure a fair return. One possible solution would be to mandate GCF to provide a political risk insurance for climate-related investments in developing

countries. This would be in a similar fashion as what the Multilateral Investment Guarantee Agency (MIGA) does for conventional investments. Coverage may go beyond pure political risk and may include currency and legal risks, for example.

Further risk reduction mechanisms. Instruments widely in use today for de-risking include cash grants, loan guarantees and concessional financing.

Waterfall structure. Combining both private and public capital in a public-private partnership (PPP) will become more feasible through the tiered risk-sharing structure known as 'waterfall'. The liabilities of a waterfall structured fund will consist of several tranches with different degrees of risks. While private investors could invest at a less risky senior level, donor countries may hold more risky junior tranches. First loss provisions for the public sector can also be considered. This type of structure mitigates risk for private investors, thereby helping to leverage private capital for what may be considered high-risk investments.

> **"The strength of the GCF, as seen by the private sector, will be in increased investor confidence."**

Climate bonds. Climate (or Green) Bonds could be guaranteed by the GCF in a later step as part of a waterfall structure to support the financing of the projects. Climate bonds are designed to have comparable credit risk and returns as conventional bonds, and therefore represent an important instrument to attract mainstream fixed income investors. Although guaranteed by the GCF, climate bonds would need to be backed by real assets with sufficient cash flows to provide returns.

PRIVATE FINANCE OBSERVERS

Inviting representatives of private financial institutions and the capital markets as permanent observers and advisers to the board of the GCF would enable expertise and know-how to be provided at a strategic level. Financiers could share experience and could identify investment requirements at both the policy and project levels. Given the innovative nature of the GCF, this participation could play an important role in feedback and learning, as well as providing input on overall principles, governance, standards and investment criteria.

LOOKING AHEAD

What is missing in many countries, particularly developing ones, are clear economic signals, incentives and sanctions to private sector actors that clearly state and make evident governments' commitment to facilitate the transition to a low-carbon economy. Also, for historical responsibility considerations, developing countries should not be burdened with the 'incremental costs' of this transition.

Therefore it is the role of the international community to make the resources available to shoulder the incremental costs, as well as to equip governments with the capacity needed to put in place the signals, incentives and sanctions needed. The GCF can, and should, address these two fundamental concerns, and engaging the private sector in such endeavour will maximise its chance for successful implementation of its mandate.

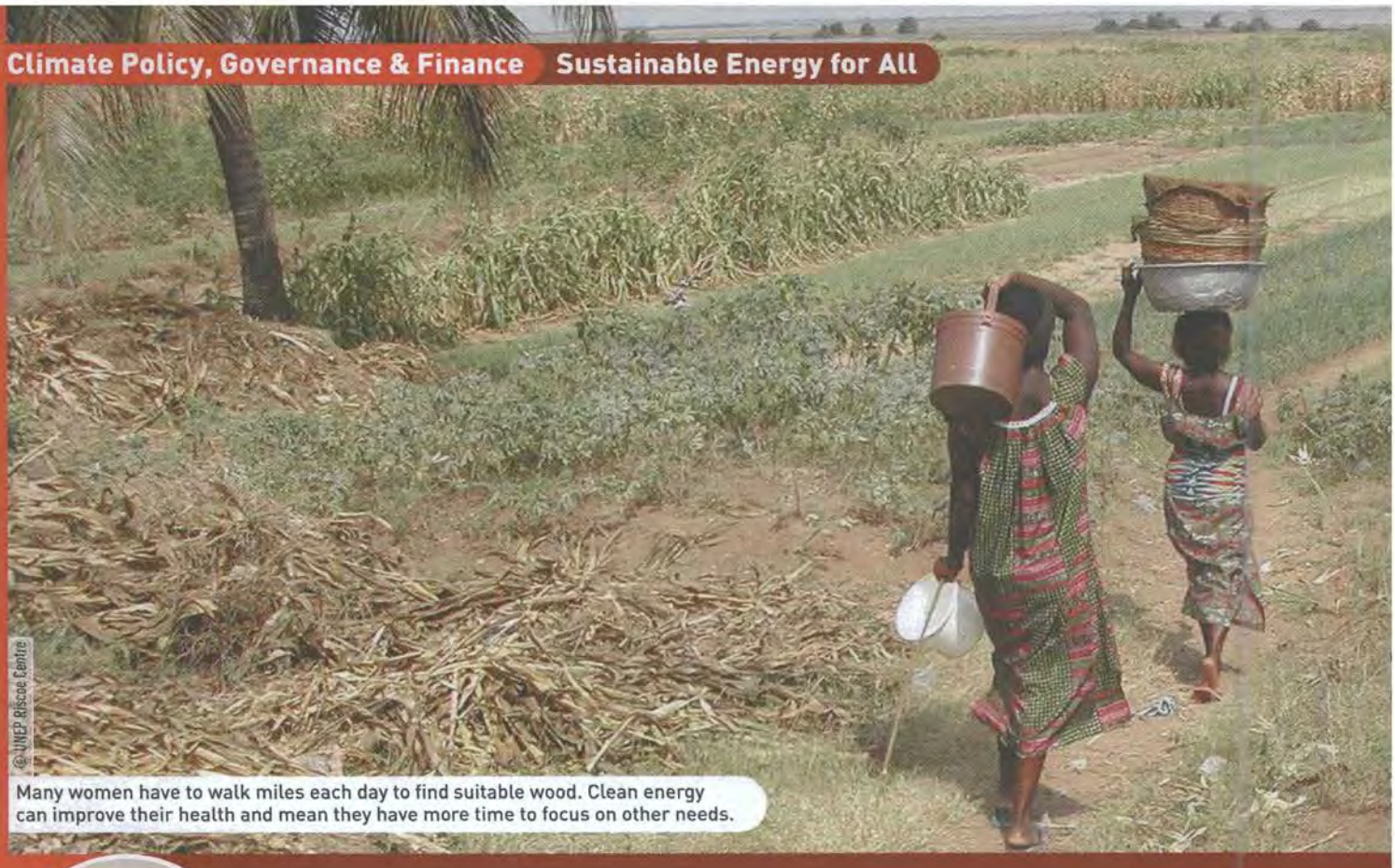
Another critical factor for the success of the GCF will be in fully utilising the expertise and know-how of the private sector. Inviting the private sector to systematically engage in the GCF processes, and further the international climate finance regime, will allow the international community to better understand, react to and guide the dynamics of the market in addressing the challenges of climate change.

The strength of the GCF, as seen by the private sector, will be in increased investor confidence which can unleash large volumes of private capital. Its focus on providing market access to developing countries so far under-serviced by international investors and by existing IFI programmes will be another important value of the proposed model. A well-structured GCF can unlock the strengths of markets and the power of private initiative to enable low-carbon and climate-resilient growth in the developing world.

Paul Clements-Hunt has been the Head of UNEP FI since November 2000. Prior to joining the United Nations, Paul spent 1998-2000 representing the Paris-based International Chamber of Commerce (ICC) directing the organisation's policy work in energy, environment and sustainable development. From 1991 to 1998, he was based in Bangkok, Thailand, where he founded the country's first environmental strategy consultancy which developed projects throughout South-east Asia.

The **UN Environment Programme Finance Initiative** (UNEP FI) is a global network of over 200 financial institutions. It is a unique public-private partnership between UNEP and the private financial sector, working to understand the impacts of environmental and social considerations on financial performance, and to channel private sector views and insights into environmental policy processes at international level, including the UNFCCC negotiations. Over the past few years, UNEP FI and partners have addressed the question of how public funds can be used most effectively towards enabling and catalysing low-carbon economic growth in developing countries. UNEP FI is in an optimal position to bring the private finance sector into partnership with the public sector, and in particular to support the TC and the GCF in structuring an agenda for engagement with the private sector.

UNEP Finance Initiative, International Environment House
Office D-512, 15 chemin des Anémones, CH-1219 Châtelaine
Geneva, Switzerland
Fax: +41 (0) 22 796 9240
Email: communications@unepfi.org
Web: www.unepfi.org



© UNEP Risoe Centre

Many women have to walk miles each day to find suitable wood. Clean energy can improve their health and mean they have more time to focus on other needs.

Sustainable Energy for All: access challenge

By **John Christensen**, Director of the UNEP Risoe Centre, **Morgan Bazillian**, Special Advisor to the Director-General of the UN Industrial Development Organization (UNIDO) and **Mark Radka**, Head of the UNEP Energy Branch

An estimated 2.7 billion people still rely on traditional solid fuels for most of their energy needs. Of these some 1.4 billion are completely without access to electricity. An enhanced understanding of the importance of energy for poverty eradication and achievement of the Millennium Development Goals has gradually emerged over the last decade. Reflecting this, the United Nations General Assembly has designated 2012 as the 'International Year of Sustainable Energy for All'. The COP17 and the Rio+20 processes offer unique opportunities to pave the way for ambitious international action on sustainable energy for all.

In the developed world energy is almost universally available, accessible, and of high quality – light at the flick of a switch, heat for cooking or comfort at the push of a button, power and mechanical energy for business at any time of day or night. In many parts of the developing world the picture is very different – and very bleak. Of the 2.7 billion relying on traditional solid fuels – wood, charcoal and dung – for most of their energy needs, many have only limited or no access to cleaner and more modern fuels such as liquefied petroleum gas (LPG), and some 1.4 billion are completely without access to electricity. For many who do have access, this means only poor quality or intermittent service. The pervasive lack of modern energy stifles income-generating activities and hampers the provision of basic services such as healthcare and education. Smoke from polluting and inefficient cooking, lighting, and heating devices kills nearly two million women and young children prematurely every year and causes a range of chronic illnesses and other health impacts. In addition, black carbon emissions from these devices worsen global climate change.

> **“Unless dedicated international and national efforts are made, the situation in 2030 will be almost unchanged.”**

GOOD NEWS AND BAD NEWS

Energy for sustainable development has been on the global political agenda since the Rio Summit in 1992. Significant results have been achieved in the last two decades during

the energy

Figure 1. Households that gained access 1990-2000.

Implementation had to be done with great speed and intensity:

In the early 90s, **China** was electrifying over 30 villages a day

Viet Nam granted almost 400 people access to electricity per hour for 15 years

South Africa made a new grid connection every 30 seconds, placed a pole in the correct position every 10 seconds and strung 200m of cable every minute

Source: AGECC 2010

which over a billion people have gained access to electricity (See Figure 1) – most of these in China and a small number of middle income developing countries. So the good news is that things are happening and expanding access even further is indeed possible.

With population growth, however, and continued unequal economic development between and within countries, the number of people without electricity access and relying on traditional fuels for cooking has remained almost constant. Projections by the International Energy Agency (IEA, 2010) show that unless dedicated international and national efforts are made, the situation in 2030 will be almost unchanged. The bad news, therefore, is that the challenge of making clean, modern forms of energy available to all people remains enormous. It is compounded by the fact that action is required in a large number of smaller and generally poorer countries, many of them located in sub-Saharan Africa.

BUILDING POLITICAL MOMENTUM

The appreciation of energy's crucial role in poverty eradication and achievement of the Millennium Development Goals (MDGs) has gradually emerged over the last decade; reflecting this enhanced understanding the UN Secretary-General in 2009 established an Advisory Group on Energy and Climate Change (AGECC). AGECC's work culminated in specific recommendations for the UN system and member states, and was instrumental in a decision by the United Nations General Assembly to designate 2012 as the 'International Year of Sustainable Energy for All'.

To support the global push, on September 20th 2011, the UN Secretary-General Ban Ki-moon launched an energy access initiative and a High-Level Group to give it momentum. The initiative seeks to achieve the goal of Sustainable Energy for All by 2030 by meeting the three interlinked global targets. Secretary-General Ban Ki-moon has invited leaders from business, government, international organisations and civil society to come together to form new public-private partnerships to implement this global energy initiative, as a stepping stone to the United Nations Conference on Sustainable Development (UNCSD), known as Rio+20, in June 2012 in Brazil.

Ban Ki-moon said he was launching the initiative with the aim, "...to catalyse action at all levels. It will bring together leaders from government, finance, business and civil society and establish partnerships that will make sustainable energy for all a reality. Energy is critical for human progress – for health, education, job generation and economic competitiveness. For the developing world, energy poverty is devastating. Taken together, energy poverty is jeopardising the achievement of the Millennium Development Goals."

THE POLITICAL OPPORTUNITIES

In the coming months two major international political processes can provide momentum to the initiative and its specific goals.

With the UNFCCC process achieving stepwise progress rather than a grandiose global agreement, the South African Government hosting COP17 in Durban has indicated that support for enhanced access to clean energy and energy services in the UNFCCC context could be an option that

provides to a large group of developing countries something deeply significant and concrete. Many of the countries with low levels of energy access are not likely to benefit greatly from large-scale mitigation finance and see themselves as being left with insufficient adaptation support as the only outcome; so Durban is an opportunity to address this concern.

The Rio+20 summit is expected to be attended at the highest possible level, with an objective of securing renewed political commitment for sustainable development, while addressing new and emerging challenges. The preparatory process so far has included a strong focus on sustainable energy in the broader context of green economy.

MAKING IT HAPPEN

The goal of the Sustainable Energy for All campaign is achievable if the right elements are put in place. The challenges are widely known, but the opportunities are likely to be even greater. Critical steps are:

- Establishing regulatory policies that improve country investment attractiveness and address real and perceived risks;
- Refining, augmenting, and implementing existing national and regional energy plans
- Supporting human and institutional capacity development; and
- Developing lists of bankable projects.

These steps also comprise a pre-condition for ensuring private sector engagement, which will be crucial for securing that the necessary investments actually take place.

Engagement of private sector entities in sustainable energy provision has been growing very fast in the last decade, with a strong focus on large-scale renewable energy projects. According to UNEP and *Bloomberg New Energy Finance*, the total investments in renewable power and fuels reached a record of US$211 billion in 2010. More than half of these investments took place in developing countries, but only limited amounts went into providing enhanced access. Interestingly, investment in industrialised countries is increasingly going into small-scale distributed systems rather than large central units, but this trend is not yet happening in the developing world, mainly due to a combination of cost and perceived business risks due to unclear policy and regular environments.

"The goal of the Sustainable Energy for All campaign is achievable if the right elements are put in place."

Many experiences point at the role that public-private partnerships can play if these are structured to ensure affordability and reliability of news energy provision, combined with a strong element of local business involvement in production, maintenance and services.

This paper draws on material by UN Energy, UN Foundation and the AGECC.

John Christensen is the Director of the UNEP Risoe Centre. He has worked on energy and development issues for the last 25 years in many developing regions and published extensively. He has been a Bureau member of the Intergovernmental Panel on Climate Change (IPCC) and lead author on several IPCC reports.

Morgan Bazilian is the Special Advisor to the Director-General of the UN Industrial Development Organization (UNIDO) on international energy policy. In this role he focuses on helping to shape the United Nations approach to energy for development. Before joining UNIDO he was Senior Advisor on energy and climate change to the Minister of Energy in Ireland.

Mark Radka is responsible for UNEP's work on reducing emissions of greenhouse gases through greater use of renewable energy and improved energy efficiency. He has a special interest in the technology needs of developing countries, and was a co-ordinating lead author of the IPCC's *Special Report on Methodological and Technological Issues in Technology Transfer.*

The **UNEP Risoe Centre on Energy, Climate and Sustainable Development** (URC) supports the United Nations Environment Programme (UNEP) in its aim to incorporate environmental and development aspects into energy planning and policy worldwide, with special emphasis on assisting developing countries.

UNEP Risoe Centre on Energy, Environment and Sustainable Development (URC), Risoe National Laboratory for Sustainable Energy
Technical University of Denmark, Frederiksborgvej 399, Bldg. 142
PO Box 49, DK 4000 Roskilde, Denmark
Tel: +45 46 77 51 29 | Fax: +45 46 32 19 99
Email: unep@risoe.dtu.dk | Web: http://uneprisoe.org

KANDEH K YUMKELLA:

"Energy powers human progress, from job generation to economic competitiveness, from strengthening security to empowering women. Energy is the great integrator: it cuts across all sectors and lies at the heart of all countries' core interests. Now more than ever, the world needs to ensure that the benefits of modern energy are available to all and that energy is provided as cleanly and efficiently as possible. This is a matter of equity, first and foremost, but it is also an issue of urgent practical importance."

Carbon trading: achievements, key lessons and future forecasts

The development of the current global carbon market, now worth over US$140 billion, has catapulted climate change to the forefront of business decisions.

By **Henry Derwent**, President and CEO and **Monique Motty**, Policy Director Assistant for the International Emissions Trading Association (IETA)

The carbon market is one of the most effective policies for tackling climate change. It inspires operational excellence and incentivises business investments in low-carbon technologies. Not only is the market expected to save over two billion tonnes of CO_2 emissions by the end of 2012, but the development of the current global carbon market, now worth over US$140 billion, has catapulted climate change to the forefront of business decisions. But while it exhibits real environmental and economic impact, and helps achieve climate change goals, it remains vulnerable to external factors.

In a period of downturn in economic growth, it is widely perceived to be positive that the carbon market has adjusted by a decrease in price. More problematic is a significant downturn in investment. *The State and Trends of the Carbon Market 2011* (World Bank) shows a 60 per cent decline in Clean Development Mechanism (CDM) investments because of the lack of a sufficiently ambitious emissions reduction agenda anywhere in the world.

After five years of rapid growth driven by European demand, the market has stagnated in volume and value terms. Over the past year or so, the European Union's Emissions Trading Scheme (EU ETS) – accounting for over 80 per cent of global carbon market transactions – has experienced embarrassing security breaches.

> **"The international community's inability to agree on a post-2012 Kyoto framework has seriously damaged the confidence of the private sector."**

Many other factors have impacted on carbon trading and carbon prices. The Fukushima nuclear accident in Japan in March 2011 increased the country's fossil fuel use, and with it CO_2 emissions and prices in the EU ETS. It has also led to some high profile reversals of government positions around the world, and to a further increase of political risk perceptions in this market.

On the political front there have been disappointments, the greatest of which was the United States failing to pass federal cap-and-trade legislation last year. Korea and Australia have delayed their domestic cap-and-trade schemes. There is great uncertainty over future investments in some developing countries as CDM investors do not know where demand will come from after 2012; and finally, the international community's inability to agree on a post-2012 Kyoto framework in Copenhagen (COP15) and Cancun (COP16) has seriously damaged the confidence of the private sector in the long-term viability of existing carbon markets.

THE COMEBACK

Nevertheless, a more optimistic reading of the resolutions from Cancun justifies confidence that carbon trading can have a future with or without global binding agreements:

- Parties at COP16 agreed to contribute annually US$100 billion into a Green Climate Fund as of 2020 to assist developing countries' climate change mitigation activities, support adaptation, technology deployment and capacity building initiatives. Much of this is expected to come from scaled-up carbon markets.
- The continued reforms of the project-based instruments, the Clean Development Mechanism (CDM) and Joint Implementation (JI), hold the promise of a real reduction in delays and a simplification of procedures.
- Outside the COP negotiations, numerous plans for the establishment of regional and national market mechanisms have emerged or are clearly continuing despite delays and setbacks: from Australia, New Zealand, South Korea and emerging economies like India, Brazil and China, to Japan's preparation of a new bilateral offset credit mechanism, and Western Climate Initiative States and

TABLE 1. OTHER EMISSIONS TRADING PROGRAMMES (TAKEN FROM NATIONAL GOVERNMENT WEBSITES)

Country	Name	Start	Goal	Key features
Australia	The Carbon Pollution Reduction Scheme (CPRS)	2011	Reduce 60% of Australian emissions by 2050	The first and largest mandatory emissions trading scheme in the Asia-Pacific.
New Zealand	NZ ETS	2008	Reduce emissions compared with 1990 levels	Covers all GHG from all sectors.
Korea	Domestic emissions trading scheme	2013	Reduce emissions by 30% by 2020	Closely modelled on the EU ETS: petrochemical producers, paper and wood processors, power generators, steel companies, and electronic chip.
China	domestic cap and trade scheme	2013	Six provinces and cities starting in 2013	Contemplating extending to become a national scheme by 2015.
Brazil	Brazilian Emission Reductions Market (BERM)	20??	Emission reduction target close to 40% of its projected BAU emissions by 2020	The Brazilian stock exchanges and the Securities Commission will be operating the market.
India	Perform, Achieve and Trade: PAT	2011	Reduce electricity's industrial consumption by 65%	Rewarding significant energy efficiency efforts in the country's most energy intensive industries with tradable energy saving certificates, which can easily be translated into carbon.
US/Canada partnership	Western Climate Initiative (WCI)	2012	Reduce industrial emissions 15% below 2005 levels by 2020	Seven US states and four Canadian provinces, respectively responsible for 13% and 50% for their countries' GHG emissions signed up to participate, though current US politics means that some have stopped participating.

Provinces in a linking of sub-national emission trading schemes across North America (see Table 1).

These developments show that carbon trading is still widely viewed as a cost-effective climate change mitigation policy. But the current state of the market and its future success is still, to some extent, dependent on post-2012 international agreements and their fulfilment.

POLICY CHANGES IN EUROPE

European confidence in the carbon market has been suffering in a variety of ways:

- The financial crisis has led to scepticism about market-based mechanisms.
- The carbon market's loss of international political momentum has had its impact in Europe too.
- The low price triggered calls for additional policy measures to make up for the supposed failures in the EU Emissions Trading Scheme.

In an effort to support future market prices, the European Commission has been seeking support for the idea of a set aside of a certain amount of emissions reduction units over the third trading phase (2013-20) to remove part of the excess supply that is keeping prices low. There is a danger of a vicious cycle that could potentially trigger a number of additional policy interventions, trying each time to react to prices but in fact only reducing prices further.

Following the security issues in the EU ETS, a complete overhaul of market integrity regulation is under way to protect the market from manipulation. The EU regulator plans to treat emission allowances like financial instruments and extend the remit of the financial supervisory authorities to the carbon market. IETA is not convinced that this will be an appropriate way forward given the characteristics of emission allowances as environmental commodities, but we will work with the regulators to tailor appropriate exemptions from financial rules for industrial market participants whose presence is vital for a well-functioning market.

More positively:

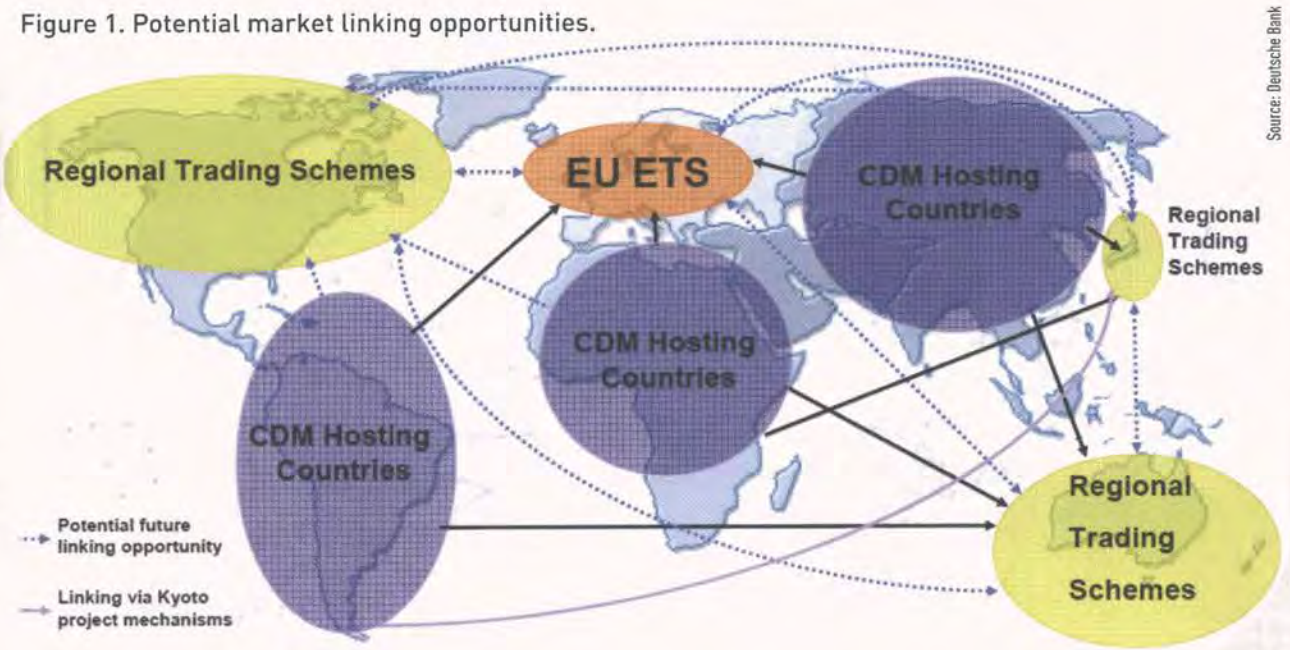
- Member states' national registries are being brought together into a single centralised European Union registry, which should provide a major structural improvement.
- Work continues to add some more sectors into the EU ETS, for instance aviation from 2012, and maybe the maritime sector after 2017.

THE FUTURE FOR CARBON TRADING

In the post-2012 world, Europe will continue to be the global leader on emissions trading and carbon markets. It seems probable that any serious move towards linking regional and national trading schemes to create the beginnings of a world market, in substitution for the Kyoto vision of a UN-driven global system, will start with or involve Europe. The EU's continued use of the CDM will keep it at the heart of the emissions trading world.

Market participants must believe in the stringency of the cap compared to a business as usual scenario, as well as in the accounting framework that certifies that an emission allowance represents one tonne of CO_2 (monitoring,

Figure 1. Potential market linking opportunities.



Source: Deutsche Bank

reporting and verification). Capital has to be able to flow towards the cheapest abatement options first, so that the carbon price represents the marginal abatement cost. But markets will suffocate if that confidence in the mechanism is broken through political risks. Many forms of government intervention may look helpful or attractive to politicians but are poisonous to the smooth and cost-effective delivery of emissions reductions that is the objective of emissions trading systems.

The processes involved in approving and using project-based offsets need to be clear, reliable and predictable. Offset programmes can only attract finance, and only offer their cost-reducing opportunities, as long as the methodology is proven to be effective and administrative delays are kept to a minimum. In addition, to be effective an emissions trading scheme needs a coherent and appropriate market regulatory regime.

“Offset programmes can only attract finance as long as the methodology is proven to be effective.”

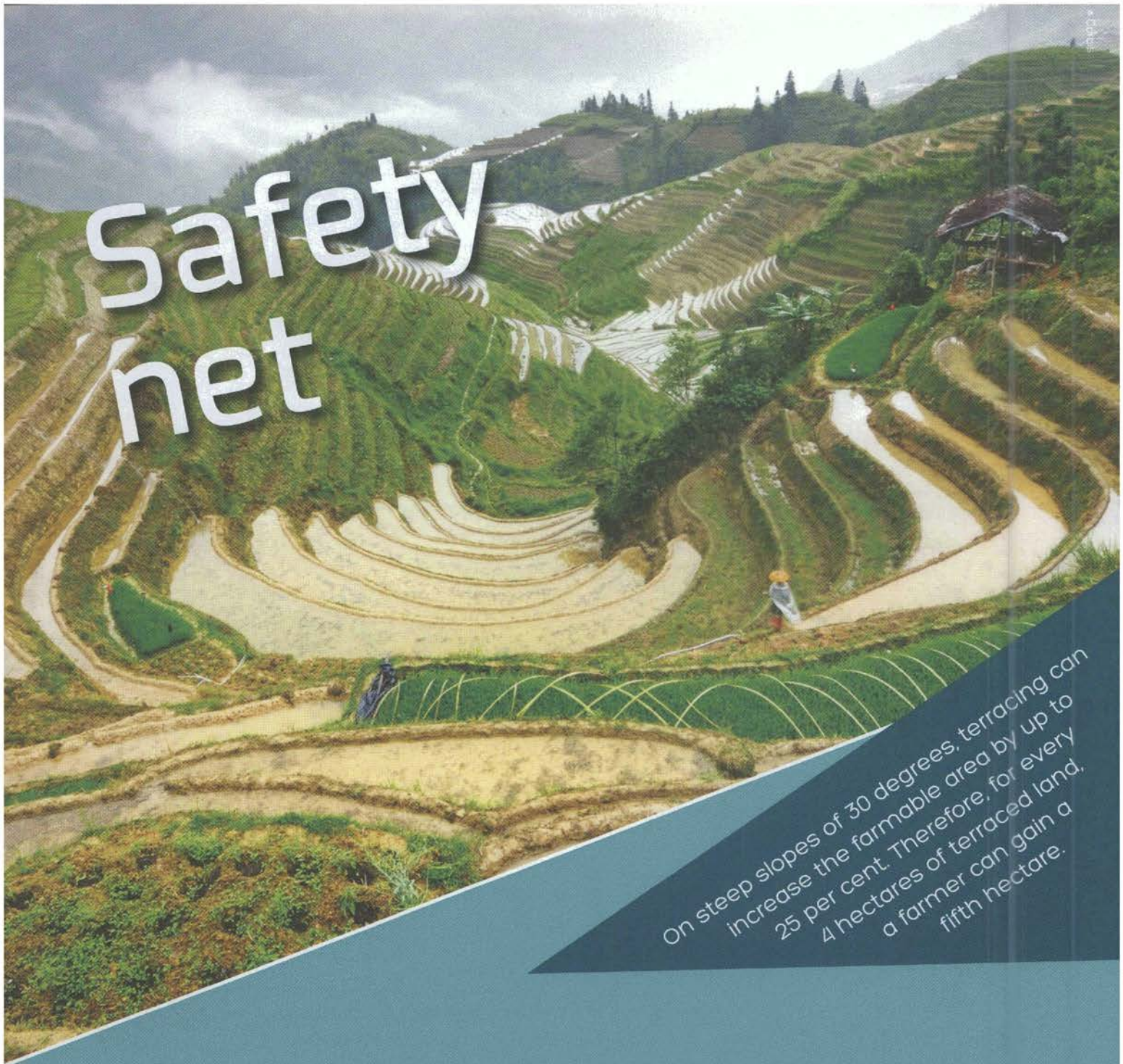
But while Europe dominates and many look to the US to secure its longer-term future, the carbon market is continuing to develop through increased participation by emerging economies. By creating the Partnership for Market Readiness (PMR), the World Bank has supported carbon markets in countries that only a short while ago seemed very unlikely to have any dealings with the policy or its objective. Thus far, Chile, China, Columbia, Costa Rica, Indonesia, Mexico, Thailand, Turkey, Morocco and Ukraine have been confirmed as beneficiaries of the US$350,000 fund to assist developing countries in creating new carbon trading schemes, put together from the contributions of Australia, the European Commission, Japan, Norway, the UK and the USA, among others. The primary emphasis is on domestic schemes, and much of the focus is on assimilating the lessons of the European scheme. But in time these initiatives could reach out to each other and to more established schemes, creating a framework for a truly global network of linked trading markets, and helping define a new chapter in the use of pricing and markets to combat climate change.

Henry Derwent became the President and CEO of the International Emissions Trading Association (IETA) in February 2008. Previously, as international climate change Director for the UK Government, he oversaw the UK's role in the international negotiations, in the G8 (especially as Prime Minister's special representative during the UK G8 Presidency in 2005) and in other forums.

Monique Motty supports the work of IETA Brussels office in researching climate policy and overlapping environmental issues with a special interest in new market mechanisms and project based mechanisms.

The **International Emissions Trading Association** (IETA) is a nonprofit business organisation created in June 1999 to establish a functional international framework for trading in greenhouse gas emission reductions. The membership includes leading international companies from across the carbon trading cycle.

International Emissions Trading Association (IETA)
24, rue Merle d'Aubigné, CH-1207 Geneva, Switzerland
Tel: +41 22 737 05 00 | Fax: +41 22 737 05 08
Email: derwent@ieta.org, motty@ieta.org
Web: www.ieta.org



Safety net

On steep slopes of 30 degrees, terracing can increase the farmable area by up to 25 per cent. Therefore, for every 4 hectares of terraced land, a farmer can gain a fifth hectare.

sustainable management of mountains not only combats climate change by helping reduce mudslides, but also helps capture water, soils and nutrients for crop production

UNEP

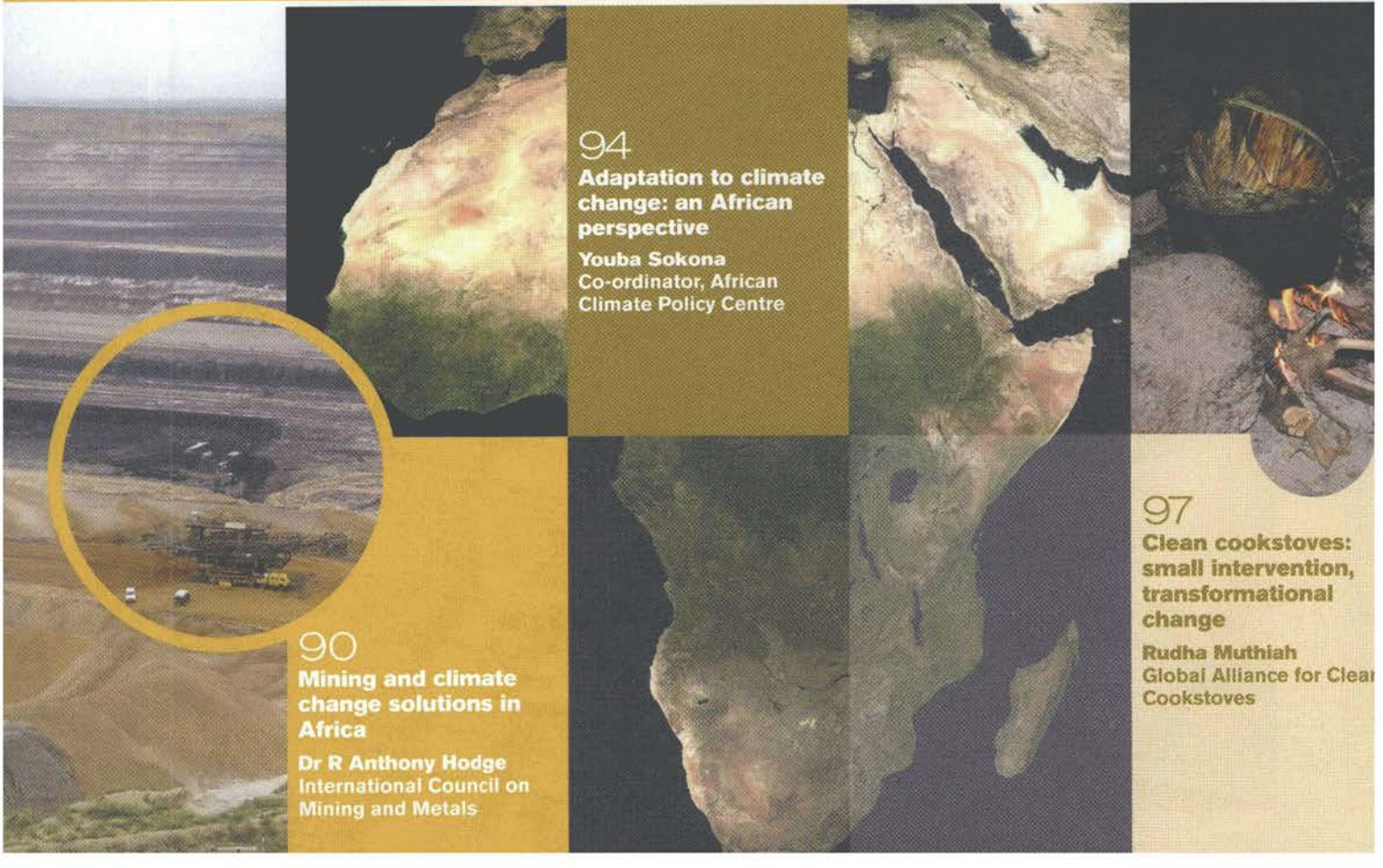
www.unep.org

GREEN ECONOMY: POWERING CLIMATE SOLUTIONS

80
Putting farming first: encouraging an efficient, competitive agribusiness sector
Lucy Muchoki
Pan-African Agribusiness and Agroindustry Consortium

85
Renewable energies: Africa's untapped leapfrogging potential
Ansgar Kiene
African Renewable Energy Alliance

SPECIAL FOCUS: AFRICA



94
Adaptation to climate change: an African perspective
Youba Sokona
Co-ordinator, African Climate Policy Centre

90
Mining and climate change solutions in Africa
Dr R Anthony Hodge
International Council on Mining and Metals

97
Clean cookstoves: small intervention, transformational change
Rudha Muthiah
Global Alliance for Clean Cookstoves

NEDBANK

Nedbank uses innovation to unlock the full value of 'green'

By **Jacoleen Simpson**, Senior Transactor, Global Markets Innovation Team and **Kevin Whitfield**, Head of African Tresuries, Carbon and Financial Products Unit, Nedbank Capital.

As South Africa's truly 'green' bank, Nedbank Group has a well-established reputation for environmental awareness, investment and action. But while the bank's extensive green credentials demonstrate its passion for caring for the environment, its significant investments into environmental sustainability reinforce its unquestionable commitment to preserving and conserving the planet's green heritage. It is Nedbank's innovative approach to environmental sustainability that has raised the bank's profile as a highly competent enabler and facilitator of financial and investment opportunities within the green space.

According to Kevin Whitfield, Head of Carbon Finance for Nedbank Capital, while the rapidly increasing awareness of the impact of climate change and the negative impact of environmentally harmful business practices have led to a worldwide reassessment of the way companies operate, the focus thus far has predominantly been on the costs involved in achieving the required positive change. In many cases, this has meant that organisations and investors have overlooked the many opportunities presented by the focus on carbon reduction and the many other components of environmental sustainability.

"While significant investment is obviously required into changing the way businesses operate," he explains, "this investment can, and should, be applied in a way that not only benefits the environment, but also delivers real opportunities for companies and all their stakeholders."

Phase 2 of the Nedbank head office in Sandton – Nedbank was involved in financing four of the five Green Star rated buildings awaded by the Green Building Council of South Africa.

Whitfield explains that this financially aware approach to 'green' business is not contrary to the spirit of environmental preservation, but is actually essential to its long-term effectiveness. "There can be no lasting environmental change by business without concomitant financial benefit," he points out, "particularly when one considers the level of ongoing investment that will be required by companies that are serious about continuing to make a positive difference to the world."

In Nedbank's case, this relationship between economic and environmental considerations is at the heart of its integrated sustainability commitment, and also informs the bank's approach to unlocking 'green' opportunities for its clients and other stakeholders via the development and provision of 'green' products and services and the facilitation of effective, return-generating 'green' investment.

THE NEDBANK GREEN INDEX

The bank's recently developed Green Index is an example of its commitment to, and competence within, the fast-developing green economy. According to Jacoleen Simpson, Senior Transactor at Nedbank Capital, the index, which is the first of its kind in South Africa, not only reinforces Nedbank's commitment to environmental sustainability, but also offers environmentally-conscious investors a benchmark by which to measure the effectiveness of investments from both a financial and environmental perspective. The Nedbank Green Index was made available as an investable index to investors in the form of an exchange-traded fund (ETF), the BGreen ETF, at the end of November 2011.

"By providing investors with a clear view of the actual financial performance of companies that meet specific and rigid environmental criteria around carbon management, climate change risks and environmental opportunities, the Green Index is not only a valuable investment tool," she explains, "but also sends a clear message to companies that environmental concern and economic prosperity need not be mutually exclusive."

The index was developed on the back of various trends that point to South Africa as one of the world's preferred destinations for sustainable investment, thanks to the country's transparent reporting structures, above average integration of social issues into the corporate environment and wide-scale commitment to the United Nations Principles of Responsible Investment.

"Despite these environmental sustainability factors, the JSE SRI Index remained the only benchmark of

responsible investment in this country," Simpson explains, "which is why we took it upon ourselves to develop an index that specifically addresses the environmental factors that underpin listed companies with a clear commitment to green."

Through this index, Simpson says that Nedbank is demonstrating that green investment principles are far more than just feel-good factors or compliance requirements for businesses. Instead, they have the ability to position organisations to adapt effectively to the fast changing business environment which, according to the results of the bank's back-testing of the companies that have initially made it into the index, generally results in outperformance against common local benchmarks of organisations without a green focus.

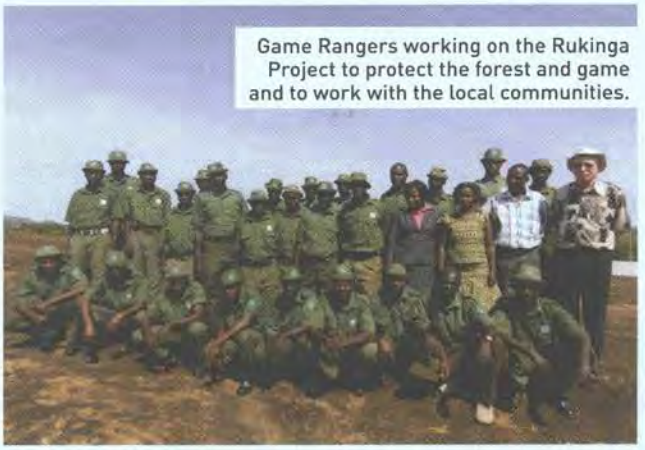
"Ultimately, the point this index makes about environmentally responsible investment is the same one Nedbank has been making for a number of years through its green products, finance and its well established support of renewable energy initiatives," Simpson explains, "that environmental responsibility does not merely imply cost; it can, and should, also deliver significant opportunity."

GREEN GOALS

This philosophy of seeking out ways of investing in green for the benefit of both the planet and the bottom line is one that informs Nedbank's view of the many environmental sustainability challenges that now face South Africa as it moves, inevitably, towards a fully functional green economy.

According to Whitfield and Simpson, this green goal requires significant investment into infrastructural development, renewable energy, and green industries. But rather than, seeing these as costs, Nedbank is looking deeper in an effort to identify and unlock the opportunities they present.

In fact, Nedbank is so committed to delivering viable, performance-driven green investment and financial solutions that it has an entire team of people dedicated specifically to this cause. The Nedbank Capital Innovation Team has as one of its key mandates to challenge conventional thinking and develop customised solutions that meet the requirements of Nedbank's clients.



Game Rangers working on the Rukinga Project to protect the forest and game and to work with the local communities.

Comprising highly skilled and experienced professionals from a diverse range of backgrounds, the Innovation Team combines fresh thinking with established expertise to deliver truly unique funding and investment solutions. And while it is not exclusively focused on green innovation, environmental sustainability considerations play a key role in the team's approach.

By combining this kind of innovative thinking with bespoke products and solutions, and its established expertise in the carbon and renewable financing markets, Nedbank is well positioned to identify green opportunities and pass them on to its clients, partners and investors in a way that rewards their environmental commitment while, at the same time, delivering sustainable benefits for the planet.

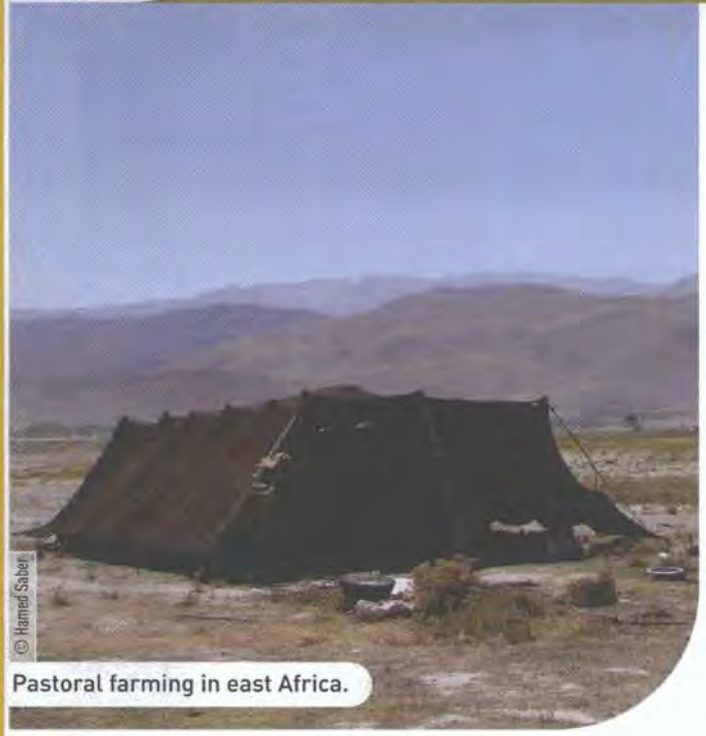
Rukinga Project, Kenya – this project recently became the world's first REDD project to issue carbon credits. It is preventing deforestation of the Kasigau Corridor and delivering significant benefits to the local community.

Jacoleen Simpson is Senior Transactor, Global Markets, Innovation Team. She has been with Nedbank Capital for more than six years, during which time she was head of OTC Sales: Equity Derivatives before joining the Innovation Team in 2009. Jacoleen recently designed South Africa's first Green Index, the Nedbank Green Index, as well as designing green investment products.

Kevin Whitfield is Head of African Treasuries, Carbon and Financial Products Unit, Nedbank Capital. The business unit is responsible for the identification, creation and management of new business opportunities. Since 2006 it has been pursuing the commercial development of CDM and voluntary carbon project activities. In 2009 the unit gained responsibility for the acquisition of carbon offsets that enabled Nedbank to become Africa's first financial institution to become carbon neutral.

Nedbank
135 Rivonia Road, Sandown
Sandton, 2196
South Africa
Tel: +27 (0)11 294 4444
Web: www.nedbankcapital.co.za
www.nedbankgroup.co.za

Putting farming first: encouraging an efficient, competitive agribusiness sector



© Hamed Saber

Pastoral farming in east Africa.

By **Lucy Muchoki**, Chief Executive Officer, Pan-African Agribusiness and Agroindustry Consortium (PanAAAC)

In a time of food insecurity and at-risk rural livelihoods, the world cannot afford to ignore agriculture's potential to achieve the triple goals of increasing food production, reducing poverty and ensuring environmental sustainability. These goals will only be achieved by growing more from less, or in other words, boosting productivity while using resources more efficiently and adaptably. Especially in countries where agriculture represents one of the primary sources of livelihood, appropriate policies and funding could drive improved productivity and more sustainable practices, changing the lives of millions.

With a predicted nine billion people living in the world by 2050, the World Bank estimates that agricultural production will have to increase by 70 per cent to meet new demands for food, feed, fuel and fibre. Yet farmers are experiencing declining growth in their productivity and new threats due to resource constraints and the impacts of climate change.

A VITALLY IMPORTANT SECTOR

As a sector, agriculture is essential to growing the economy sustainably. It can be a potent driver for reducing poverty, stimulating growth and ensuring food and nutrition security. For instance, the World Bank estimates that GDP growth from agriculture generates at least twice as much poverty reduction than any other sector.

Worldwide, agriculture employs 37.3 per cent of the world's current labour force, 97 per cent of whom live in developing countries, according to the International Labour Organization (ILO). In Uganda, for instance, 82 per cent of the work force is dependent on agriculture (CIA *World Factbook*). Currently, 65 per cent of people in developing countries are involved in agriculture. Small farmers account for 1.3 billion of this group, and they have limited access to inputs, infrastructure and markets.

> **“As a sector, agriculture is essential to growing the economy sustainably.”**

A dynamic and productive agricultural sector is also essential for the urban population. In 2010, for the first time ever, more people lived in urban areas than in rural areas globally. Urban populations are dependent on the agricultural sector for most of their consumption, so improving local production and trade is crucial to them, as well as to farmers seeking to reach urban markets to sell surplus crops.

Making agriculture a dynamic sector will require the adoption of supportive policy and regulatory frameworks, as well as investment in infrastructure and input/output markets. Farmers need to be able to access markets at the local, regional and global level in order to sustain a livelihood from their activities.

> **“A dynamic and productive agricultural sector is also essential for the urban population.”**

The Pan-African Agribusiness and Agroindustry Consortium (PanAAAC), for instance, oversees programmes with its partners in Kenya to provide agri-extension training for the agricultural sector, including policy-makers and farmers, to introduce them to new technologies and give them the knowledge they need to use them effectively.

These technologies are often quite simple, such as greenhouse farming, improved seeds, or information and communication technology (ICT) to access weather and price information.

Another example is ESOKO, a Ghana-based trading platform for those in the agricultural value chain. Users can sign up for SMS alerts for commodities and markets of their choice and receive instant alerts for offers to buy or sell as soon as anyone else on the network has submitted an offer on their mobile phone. Users can also request and receive real-time prices for more than 80 commodities from 400 markets across West Africa, reducing the transaction costs substantially.

ENHANCING SUSTAINABLE PRODUCTIVITY

Enhancing sustainable productivity must be the centre of efforts to make agriculture more economically dynamic. We need to achieve more crops per drop of water, per acre of land, per measure of inputs. Producers need to be integrated in value chains and new activities need to be developed in processing and other sectors to improve rural incomes and ensure that growth in productivity translates into better livelihoods.

> **“Enhancing sustainable productivity must be the centre of efforts to make agriculture more economically dynamic.”**

Global leaders should foster agricultural research and development to reverse a generation's decline in aid for the sector. Agriculture's share of official development assistance (ODA) dropped to five per cent in 2004, down from 22 per cent 30 years ago, and it has also dropped in absolute terms. Agriculture is a knowledge-intensive sector. Farmers, especially women farmers, need to have access to training, extension services, and sharing of traditional knowledge that can encourage the production of abundant and nutritious crops and mixed diets. Knowledge helps farmers adopt practices that maximise the efficiency of the inputs they use and help protect the natural resources on which they depend.

Providing this education to rural communities in a systematic, participatory manner is essential to improving their production, income and quality of life. Extension services disseminate practical information related to agriculture, including correct use of improved seeds, fertilisers, tools, tillage practices, water management, livestock management and welfare, marketing techniques and basic business skills to address poverty. Extension is also an essential pillar for rural community progress, including support for the organisational capacity of farmers' groups and the formation of co-operatives.

POLICIES FOR PRODUCTION

Governments must create aligned policy environments which support farmers as small-scale entrepreneurs. They can support future food and nutrition security by encouraging a range of crops and produce to be grown to avoid hunger and malnutrition. This effort will rely on increasing the productive capacity of farmers, especially in food-insecure countries, through a focus on:

- Land tenure security;
- Access to banking and micro-credit;
- Access to inputs and irrigation;
- Agricultural extension services to share knowledge with farmers;
- Reduced post harvest losses through storage;
- Rural infrastructure.

For example, in Kenya, more than one million households, mostly smallholders, depend on dairy farming as a source of income. TechnoServe is working with these farmers and processors to improve milk productivity and quality and increase market access for small-scale farmers. New farmer-owned bulk collection and cooling centres enable rural farmer groups to sell to major urban processors. These centres also serve as hubs for farm supplies and veterinary and financial services.

THE NEED FOR MORE INTRA-AFRICA TRADE

For goods to move across national boundaries there is need to foster international agreements which in turn will create non tariff zones. Intra-Africa trade is estimated to be less than 10 per cent as compared to the Americas' 40 per cent and 60 per cent in Europe. The potential is huge for this type of trade in an area with 65 million people and a GDP of almost a trillion dollars.

There are efforts currently ongoing to address the challenges of lack of intra-Africa trade. Such an initiative is the Tripartite Free Trade Area (TFTA), which among other things aims at harmonising trade tariff regimes among 26 member states in Africa. These include the marrying of tariff regimes of trade blocks currently established in Africa (COMESA, East Africa Community and SADC) and negotiating modalities of implementing a free trade area.

The TFTA is a positive initiative that will deliver many benefits to African trade. However, there still exist many challenges in implementing such an initiative, especially the fact that most countries in Africa have restrictive trade regimes (seven African countries are in the bottom ten most restrictive). Clear negotiations can create a win-win situation for countries like Zambia and Malawi, which are heavily reliant on trade taxes, with about 25 per cent of revenues coming from this source. For such, alternatives should be explored.

Modern extension services must increase farmers' capacity to engage in two-way information sharing – between experts in research and farmers themselves who have essential information on farming. Research and extension should be functionally linked and there should be pluralism in the approaches to implementing this form of education. Mobilisation of the scientific, donor, business, NGO and farmer communities is needed to improve knowledge sharing and to help reliable small businesses, such as agro-dealers, to be able to adopt new practices and technologies.

Additionally, efforts should be increased to promote sustainable agri-food systems throughout the product cycle. In 2010, the UN Food and Agriculture Organization (FAO) estimated that poorly developed systems for handling, storing, packaging, transporting and marketing of agricultural products in developing countries resulted in post-harvest losses ranging from 15 per cent to a staggering 50 per cent. Investment in food infrastructure and handling could reduce losses, and improve food safety. Developed countries also face losses due to food waste from harvest, through delivery to food services, and in households. Waste is worst in fresh produce which delivers vital nutrients to humans around the globe.

SUPPORTING RESILIENT AGRICULTURAL MARKETS

Agriculture is in desperate need of capital investment, especially to feed nine billion people in 2050 and reduce the number of people living in poverty. This is particularly important in Africa where 61 per cent of rural people are living in extreme poverty – many of whom rely heavily on agriculture as a source of income.

> **"On average, only 16 per cent of crop yields ever enter international markets."**

Governments need to encourage investment in agribusiness. Price caps will fundamentally destroy that investment. Regulation is also important for private investors. Governments must harmonise regulatory systems for food safety, tolerances, maximum residue levels and so on, to remove the unnecessary challenges associated with commodity exports. This also applies to imports. For instance, a programme is currently under way to address seed market problems in the Southern African Development Community (SADC). The project, implemented by the Food, Agriculture, Natural Resources Policy Analysis Network (FANRPAN), seeks to support the creation of regional seed markets by harmonising seed policies and legislation across SADC member states.

Global leaders must encourage the creation and use of transparent markets and national/regional commodity exchanges and avoid export bans on food and agricultural inputs. They must not interfere with transparent markets, as in a sense all market users are speculators, and are currently a valuable source of capital flowing back into agriculture.

Mechanisms must be developed for price and market information sharing. In spring 2011, the FAO Food Price Index was reaching historic highs. Particularly for farmers in food-insecure areas, good price transparency improves fair contracting and encourages regional trade among food-insecure countries, for instance in sub-Saharan Africa.

> **"Knowledge can only grow when more farmers have access to improved and new ICTs."**

Information on markets must be collected regionally, including informal markets. On average, only 16 per cent of crop yields ever enter international markets (WTO). Yet, trade in commodities may be far higher than understood due to informal markets, particularly in developing countries.

FARMING NEEDS SECURITY AND STABILITY

Farming can only function where there is the rule of law, personal security, land tenure security and peace. Knowledge can only grow when more farmers have access to improved and new ICTs to help provide them with the extension services and market information they need. Environmental stewardship can only be supported by acknowledging farmers' role as the gatekeepers of the world's natural resources.

Putting farming first is the key to continued, sustainable development. Agricultural policies should address the need for further productivity increases, be science-based and farmer-centered, and allow for a mosaic of solutions to be accessed by farmers.

Lucy Muchoki is the Chief Executive Officer of the PanAAAC and a spokesperson of the Farming First coalition.

The **Pan-African Agribusiness and Agroindustry Consortium** (PanAAAC) is a private sector driven platform bringing together African agribusiness and agro industry value chains and support services to enable them to access information, knowledge, strategic partnerships and financial remediation. **Farming First** is a global agricultural coalition representing the world's farmers, scientists, engineers and industry as well as agricultural development organisations.

Pan African Agribusiness and Agroindustry Consortium
PO Box 2542 – 00200, Muthaiga North, Parkside, Nairobi, Kenya
Tel: +254 20 2371307, 2213303, 2213304
Fax: +254 20 2246737
Email: lmuchoki@panaac.org
Web: www.panaac.org; www.farmingfirst.org

VSHydro (Pvt) Ltd.

Climate change and the benefits of mini-hydro

One of the greatest challenges facing mankind – and all living creatures – is the threat of adverse patterns of weather and climate during the next 50 years. Unplanned at that time, industrialisation and the rapid scramble for natural resources have left us with little ground cover protected by the earth's natural benefits.

Wey Ganga Project – weir and spillway.

Sri Lanka has had the good fortune that this deterioration happened at a slower pace. Localised solutions are now addressing the problem effectively.

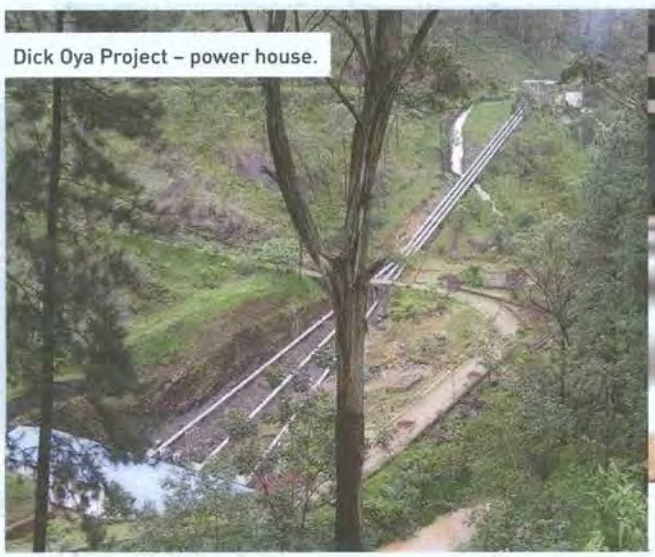
VS Hydro is lucky that the group's founder, Premasiri Sumanasekera, as a meteorologist, set the firm in the direction of climate action when such thoughts were in their infancy.

Kadawala 1 Project – weir, channel and power house.

Our current operations in the field of renewable energy are geared within international guidelines and our own innovative standards, from project conceptualisation to delivery of the final product.

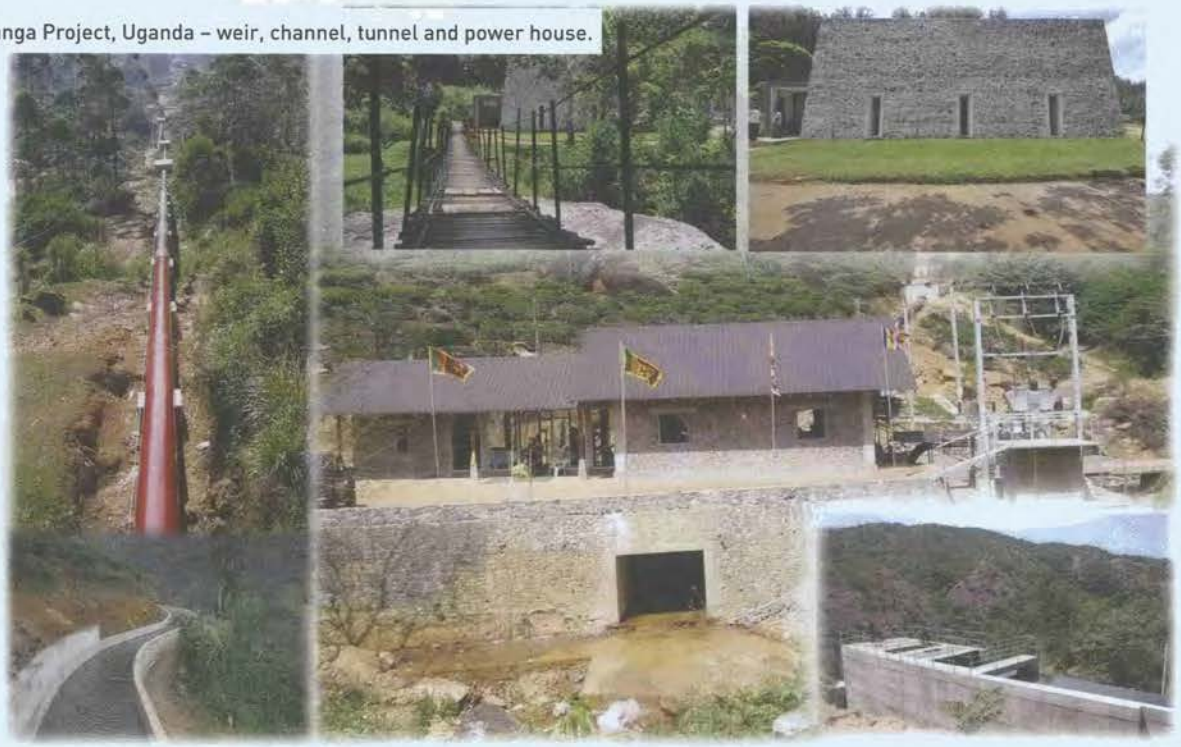
From 2003, VS Hydro has evolved by promoting the concept of mini-hydropower projects, a trend which has resulted in an industry where over 200 MW of capacity is generated from this source. If this had not been successful, 200 MW of thermal generation would have had to be implemented over the years, resulting in much pollution and foreign exchange costs.

This environment-friendly concept has now been taken by VS Hydro to East Africa as well. VS Hydro has already designed, built and commissioned an 18 MW small hydro-power plant in Mpanga, Uganda, and is in the process of developing other projects in Uganda, Kenya and Tanzania.

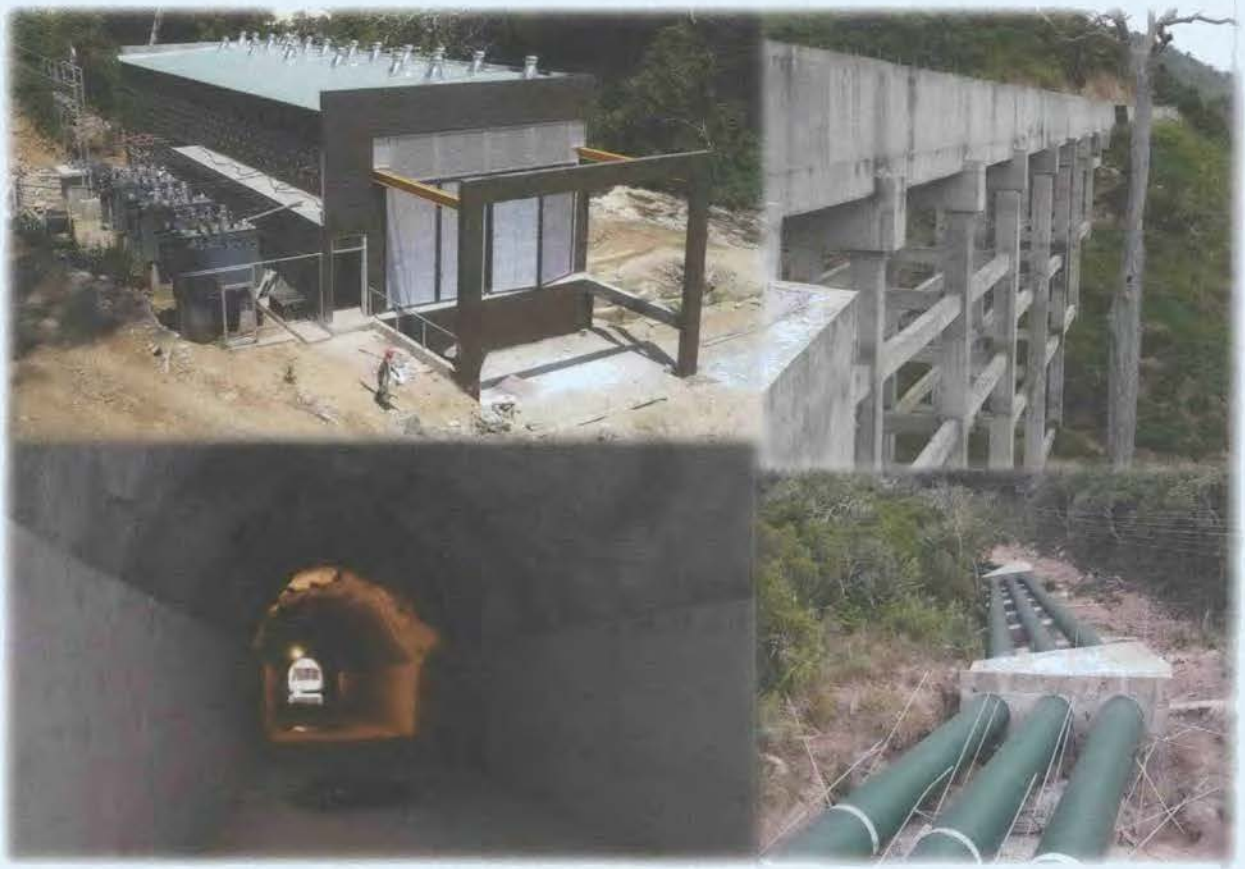


Dick Oya Project – power house.

Mpanga Project, Uganda – weir, channel, tunnel and power house.

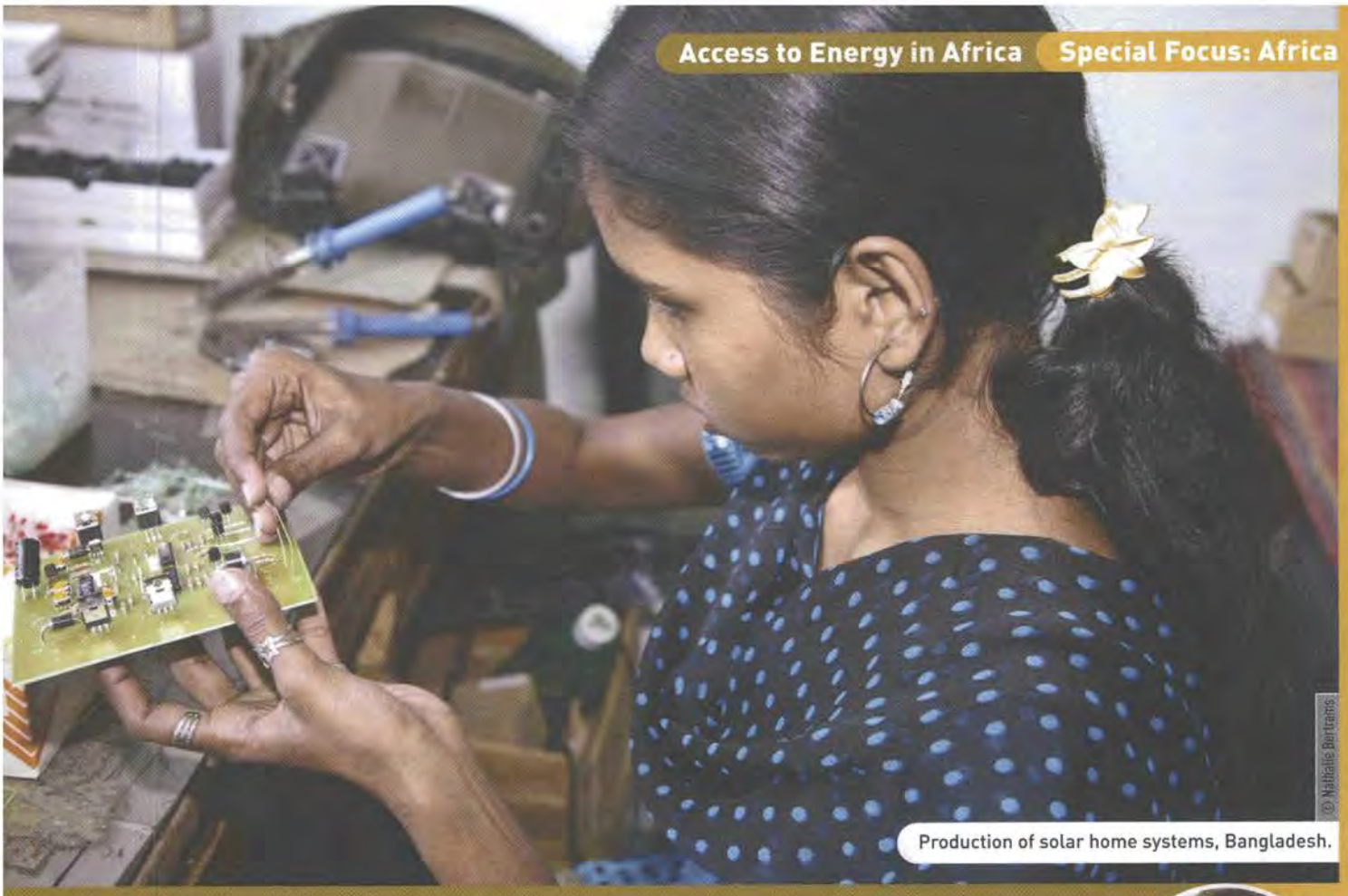


The turbines installed in Uganda and in many hydropower plants in Sri Lanka are manufactured by VS Turbo, a subsidiary of VS Hydro, which is a state of the art manufacturing plant producing turbines using German technology.



Prabodha Sumanasekera – Chairman
Email: prabodhaks@yahoo.com
Nishan Mahanama – Managing Director/CEO
Email: nmahanama@yahoo.co.uk

VS Hydro (Pvt) Ltd
19, Meetotamulla Road, Kolonnawa, Sri Lanka, 10600
Tel: +94 11 253 3443/4 | Fax: +94 11 257 2546 | Web: www.vs.lk



© Nathalie Bertrams

Production of solar home systems, Bangladesh.

Renewable energies: Africa's untapped leapfrogging potential

By **Ansgar Kiene**, Co-ordinator, African Renewable Energy Alliance (AREA)

Energy is one of the keystones of social and economic development and it affects all its major aspects such as environmental protection, gender equality, food security, climate change mitigation, health, education, and poverty alleviation. This is why access to affordable, sustainable modern energy services – electricity as well as thermal applications – is a major determinant for progress in achieving poverty reduction and the attainment of the millennium development goals (MDGs) in Africa. In rural areas of African countries, the share of people with access to modern energy services is as low as eight per cent. Only four per cent of worldwide electricity production is generated on the continent. And yet the technology and natural advantages are ready for Africa to embrace distributed renewable energy, leapfrogging the stage of inefficient central generation.

On average, Africa consumes about 492 kWh electricity per capita, compared with the EU with over 3,000 kWh, and the US at 7,700 kWh. With a total installed capacity of 103 GW, Africa has less power generation capacity than, for instance, Germany with 120 GW. Of these, 103 GW, 46 per cent are located in South Africa and 34 per cent in northern Africa (JRC 2008). Almost two-thirds of the African population of one billion people have no access to electricity.

THE COST OF POVERTY

Despite its fast growing population and economies demanding ever more energy, 80 per cent of the African population still relies primarily on traditional biomass, including fuel wood or charcoal, agricultural waste and animal dung to fulfil their daily energy needs.

Generally, almost all African countries are going through severe energy crises, as energy demand increases more rapidly than energy supply. The continent's future energy production and consumption are expected to soar. However, infrastructure is poor and outdated, resulting in high efficiency losses. Deficient power infrastructure dampens economic growth and weakens competitiveness by choking productivity. In addition, skyrocketing prices for fossil fuels and the huge costs for nuclear power plants (as well as issues of hazardous waste, mining and operations) leave societies with little alternative to renewable energies. Large-scale hydro power projects are sometimes suitable, but often result in negative environmental and social impacts.

The consequences of the lack of access to modern energy technologies are severe. Because of the inefficiency of traditional energy sources, the poor often pay higher unit costs for energy in comparison. In many cases, fuels are burned in poorly ventilated or enclosed spaces leading to indoor air pollution. The World Health Organization (WHO) estimates that 400,000 mainly women and children in Africa die of indoor air pollution every year. Through unsustainable use of biomass, Africa is losing more than four million hectares of forest every year – twice the world's average deforestation rate, which makes the continent even more vulnerable to the effects of climate change. A large percentage of household incomes is spent on energy for electricity and cooking (diesel, kerosene, charcoal, etc.). At the same time, women invest a substantial amount of productive time in collection and transport of fuel wood.

LEAPFROGGING IS GOOD BUSINESS

When technologies reach a suitable point of development, it is possible to 'leap over' the necessity for expensive infrastructure by using distributed, self-contained systems. The massive success of the mobile phone market in less developed countries is a striking example of this. In Africa, mobile phone penetration is exceeding all expectations. New technologies, a huge demand and the liberalisation of the telecommunications sector, supporting active competition, have drastically revolutionised the market and led not only to improved service delivery and quality but to a surge in overall business activities.

> **“Because of the inefficiency of traditional energy sources, the poor often pay higher unit costs for energy.”**

By now, many renewable energy technologies have reached competitive levels with conventional energy sources. This is the point at which leapfrogging becomes not only possible but profitable. Drawing on the success story of mobile telecoms, individual entrepreneurs as well as major corporations are offering demand-driven, tailor-made energy services in Africa – applications from solar home systems providing basic lighting to wind farms powering industrial production. Innovative financial schemes are being developed; new distribution and service networks are established to guarantee maintenance. In addition to the activities of the private sector, communities and municipalities have begun to decide on alternative energy provision, fostering social stability through local empowerment and public participation.

Since an overall energy scarcity has resulted in high costs for transport and industrial/commercial sector operations in most African countries, sustainable economic growth can best be achieved on the basis of renewable energy provision for industries. Also, empirical evidence has shown that the diversification of electricity production in African countries such as Kenya or Mauritius has resulted in a stabilisation of the power sector. Africa's vulnerability to external shocks, the risks related to volatile prices for fossil fuels and droughts in the case of large hydro power capacity, have been reduced without high subsidies or increases in the electricity price.

> **“The investment decisions made now will shape the structure of African energy systems in the next 30 to 40 years.”**

In order to meet the energy needs of African people in the future, the new investments required in the coming decades will be massive. The investment decisions made now will shape the structure of African energy systems in the next 30 to 40 years. Therefore, this window of opportunity is ideal for a transformation of national energy systems from large-scale conventional power plants to decentralised renewable energy technologies. These offer great economic potential in an expanding market, as the renewable energy resources in Africa have hardly yet been exploited.

THE POLITICAL DIMENSION

In order to reach the energy poor, political and business concepts for sustainable energy services will have to be developed. Renewable energies can contribute to a large number of political objectives, such as job creation and

Solar powered transmitter, Morocco.

© Nathalie Bertrams

Solar powered fridge for vaccines and medication, Ghana.

poverty eradication, a sustainable use of resources, the protection of both human health and the ecosystem. This is particularly true for small to medium scale renewable energy systems that provide affordable energy to livelihoods currently defined by energy poverty, and help in creating employment by powering enterprises for both rural and urban populations. Once again, mobile communications have shown the way forward.

“Energy services have a significant role in facilitating both social and economic development.”

The rapid expansion of renewable energies across Africa will have a positive impact not only on the African people, its economic progress and the protection of its environment, but also on the world leapfrogging the fossil-fuel-based development of the industrialised countries.

Energy services have a significant role in facilitating both social and economic development – energy underpins economic activity, enhances productivity, and provides access to markets for trading purposes. In addition, it enables fulfilment of the basic human needs of nutrition, warmth, and lighting; and enables access to education, health, information and communication services. The shift from fossil fuels to renewable energies across Africa also has the potential of giving a boost to the achievement of all eight of the Millennium Development Goals (MDG).

Africa's energy challenges require a radical scaling-up of access, which calls for an improved enabling environment, effective policy and regulatory frameworks, improved management capacities and financial services. Keeping in mind the unlimited renewable energy availability, there is a huge opportunity in directing investments into clean, efficient, renewable energy for the growth of a green economy in Africa.

Ansgar Kiene is Co-ordinator of the African Renewable Energy Alliance and Director of the World Future Council Africa.

The **African Renewable Energy Alliance** (AREA) is a global platform for policy-makers, business, civil society and academia to exchange information and consult about policies, technologies and financial mechanisms for the accelerated uptake of renewable energies. In the quest for sustainable solutions at regional, national and international levels, AREA plays a catalytic role in promoting knowledge transfer and international co-operation. Founded in Ethiopia in October 2009 by the World Future Council, this member-driven network comprises over 500 members from 60 countries. AREA members share information, knowledge and experience via an online platform and monthly phone discussions, meet for international AREA conferences and workshops and present their positions at relevant conventions and forums.

African Renewable Energy Alliance – AREA
13 Second St, Melville 2109, Johannesburg, South Africa
Tel/Fax: +27 (0)11 72 61 113
Email: ansgar@area-net.org; info@area-net.org
Web: www.area-net.org

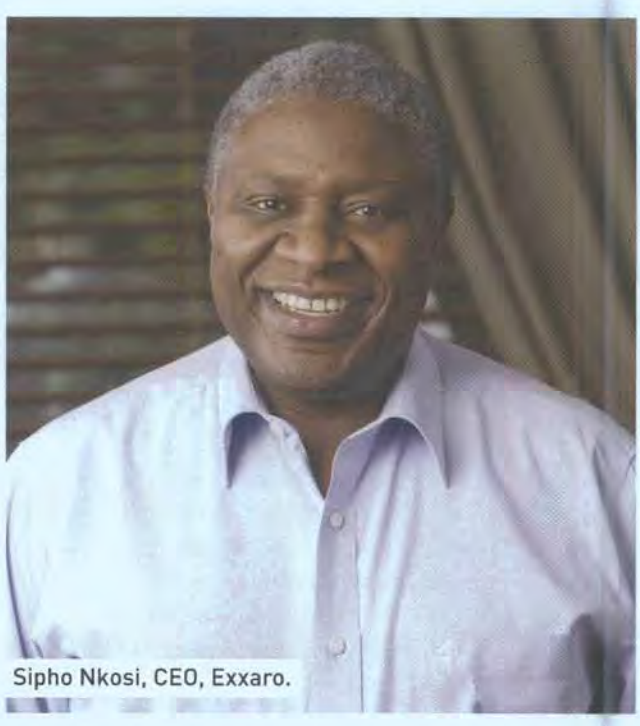
exxaro
POWERING POSSIBILITY

A multi-faceted mining response to climate change

Exxaro Resources Limited (Exxaro) is one of South Africa's largest diversified resources companies, with a portfolio including; coal, mineral sands and iron ore. It is a top 40 company listed on the Johannesburg Stock Exchange in terms of market capitalisation, with a geographic spread spanning South Africa, Namibia and Australia.

Exxaro's growth portfolio is aimed at optimally positioning the group in the current economic climate. It provides a balance between commodity and project portfolios and the company's longer-term growth aspirations. Exxaro's core growth areas include:

- Coal and reductants;
- The energy portfolio;
- Iron ore and ferroalloy projects;
- Mineral Sands and titanium slag for pigment producers;
- Copper.


Sipho Nkosi, CEO, Exxaro.

"Exxaro's growth portfolio is aimed at optimally positioning the group in the current economic climate."

In 2007 Exxaro's leadership recognised that it had to deal with energy in its broadest context (shortages, rising costs, climate change, environmental concerns) in order to remain competitive and sustainable for the benefit of all its stakeholders. Over the last four years, Exxaro has been addressing three issues that have become central to the South African energy environment. These are:

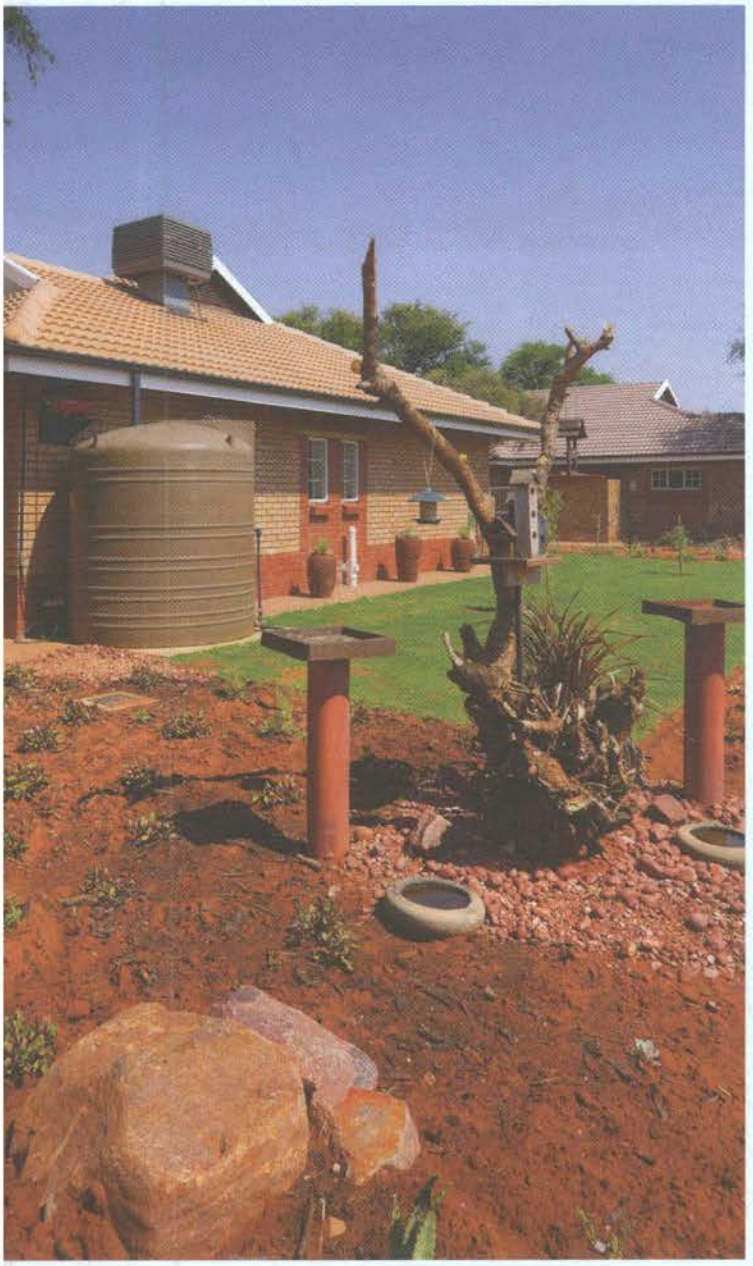
- Energy security (security of supply, reliability);
- Economic productivity (growth in demand, price volatility);
- Environmental impact (climate change, land and water use, carbon emissions).

A MULTI-FACETED RESPONSE TO CLIMATE CHANGE

Exxaro formed a Clean Energy Forum in 2007 which led to the formulation of the Energy and Carbon Management Framework in 2008 and a Climate Change Position Statement finalised in 2010. A Climate Change Response Strategy is also being devised. An Energy Efficiency Forum, consisting of representatives from each business unit, identifies risks and opportunities, shares knowledge and develops best practices in executing energy efficiency projects. Energy efficiency in design is being addressed – most recently at the group's new coal plants in South Africa's Limpopo province and in the low-energy-use houses built by the company for its employees at these plants. The Energy and Carbon Management Framework has also seen the company's general risk register being updated to take account of climate change risks. Exxaro participates in the energy debate at a local, national and international level through membership of a variety of industry and global institutions.

"The group is identifying opportunities in strategic minerals such as titanium, zircon and copper, which will be necessary for the low carbon economy."

Exxaro embarked on the formation of a new energy company in 2009 aimed at generating power for the



company and the country via a mix of renewable and cleaner energy sources. The group is also identifying opportunities in strategic minerals such as titanium, zircon and copper, which will be necessary for the low carbon economy.

"Participation in the international Carbon Disclosure Project has facilitated the introduction of processes to measure the company's carbon emissions."

Exxaro's energy division is currently in a pre-feasibility phase for a 40MW wind farm at Brand-se Baai in the Western Cape, a 60MW wind farm at Tsitsikamma in the Eastern Cape in a JV with a local community and partner, and a 30MW Concentrating Solar PV Power Plant in Limpopo. Development of the first five-spot test for the Coal Bed Methane project in Botswana, with the aim of testing for economic gas flow, is progressing well.

A pre-feasibility study is underway to develop a 600 MW – 1,800MW base-load independent power producer (IPP) coal-fired power station. Exxaro is also developing co-generation projects at its Namakwa Sands and Grootegeluk business units in the Western Cape and Limpopo provinces respectively. A biofuels project in Mpumulanga province is aimed at generating biodiesel for captive use within Exxaro and at reducing the company's carbon footprint.

Exxaro is seeking Clean Development Mechanism (CDM) status and is proceeding with project validation and eventual certified emission reduction (CER) registration with the UNFCCC for a number of its clean energy projects.

Exxaro's participation in the international Carbon Disclosure Project has facilitated the introduction of processes to measure the company's carbon emissions and provides valuable insight into the company's overall emissions performance and thus allows for clear target setting in its energy strategy.

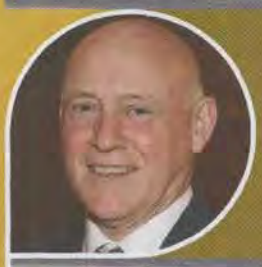
ENERGY EFFICIENCY IN EMPLOYEE HOUSING

To support the expansion of Exxaro's Grootegeluk coal mine, nearly 800 new housing units had to be provided. Discussions turned to buildings that were less reliant on a connection to the power grid, and were planned to save energy. Various housing types were designed with temperature-sensitive orientation, insulation, overhanging roofs for water collection, solar water heating and evaporative cooling.

Local skills and resources were used as far as possible. Through the incorporation of energy-efficient elements, the housing initiative will result in a direct saving of 2,334MWh per annum, or the equivalent of 2,400 CO_2e/t, with a potential future saving in carbon tax.

Exxaro
Roger Dyason Road
Pretoria West, 0183
South Africa

PO Box 9229
Pretoria, 0001
South Africa
Tel: +27 12 307 5000
Fax: +27 12 307 4760
Web: www.exxaro.com



Mining and climate change solutions in Africa

© user.ckeim

Mining is often associated with environmental damage.

By **Dr R Anthony Hodge**, President, International Council on Mining and Metals (ICMM)

Mining is often associated with environmental damage and pollution, and rarely seen as a force for good in the transition to a green economy. The mining and metals industry produces two per cent of all energy-related global greenhouse gas emissions in its direct activities, equivalent to that of Canada – the world's sixth largest emitter. Nevertheless, this industry is an integral part of any long-term, sustainable solution to the challenge of climate change.

The mining and metals sector not only supplies essential materials that form the backbone of modern society, but their production can contribute to new technologies and innovative solutions in the fight against climate change. For example, the steel used in each new wind turbine will require around 300 tonnes of iron ore and 250 tonnes of coking coal to make. Mining companies are also major consumers and producers of both high and low carbon energy (e.g. coal and uranium), giving them direct equity in the global policy debate on climate change.

The ICMM was formed in 2001 by a group of CEOs committed to bridging the divide between the mining industry and the global sustainability agenda. In November 2009, ICMM released Policy on Climate Change, which outlined its members' commitment to work together in a global effort to reduce carbon emissions. It was followed in 2011 by a set of recommendations by CEOs on the way forward in addressing climate change by providing a set of principles and corporate commitments, as well as three focus areas for further analysis in ICMM's work programme. This will be officially presented to the global policy community at the COP17 Conference in Durban, South Africa.

A PRAGMATIC APPROACH

After years of negotiations it has become clear that a legally binding global agreement is a distant prospect. While a global framework remains an important long-term goal, it is imperative that policies are based on current global realities. ICMM thus advocates a pragmatic approach that can help design effective and efficient national and sub-national policies. It is also important that policies and major industries look to complement each other to obtain the desired goals.

> **"The mining and metals industry is an integral part of any long-term, sustainable solution to the challenge of climate change."**

ICMM members have a part to play in tackling many of the challenges brought about by climate change and they have committed to this goal. This includes developing greenhouse gas emission reduction strategies, ensuring efficient use of natural resources, supporting research and development of new technologies as well as measuring and reporting progress. A number of those operating in Africa have already devised inventive solutions that promote sustainable outcomes without sacrificing their competitive edge.

CARBON TRADING AND METHANE CAPTURE

In 2010, Gold Fields became the first gold mining company to engage in the Kyoto Protocol's carbon trading scheme by capturing methane at its Beatrix Gold Mine in South Africa's Free State province. The company derives Certified Emission Reductions (CERs) – financial securities used to trade carbon emissions – from this process, which are then sold on the global market. The funds earned from the initiative will be used to develop energy projects using the captured methane.

In September 2011, the project was registered by the UNFCCC. It is expected to reduce the company's carbon

dioxide emissions by 1.7 million tonnes between 2011 and 2018. This project is a prime example of how mining companies can channel their technical expertise towards a sustainable and market-friendly outcome.

ENERGY EFFICIENCY AND NEW TECHNOLOGIES

In South Africa, mining companies are faced with growing environmental concerns, proposed carbon taxes and rising electricity prices. Because commodity prices are set on global markets, these pressures have to be absorbed by companies, with negative implications for their competitiveness. Currently 17 per cent below government targets on energy use, AngloGold Ashanti is faced with the challenge of keeping within these limits while expanding its operations. As a result it has channelled its resources into developing a cutting edge energy savings system.

The majority of a deep underground mining company's electricity consumption is taken by compressed air systems, ventilation fans and refrigeration – essential when working at higher temperatures underground. AngloGold Ashanti has undertaken a number of whole system improvement projects, one of which is the optimisation of their air compression network using a hi-tech computer simulation program, investing R5 million (US$ 635,704). It will result in an annual electricity saving of 2.7 megawatts, roughly equivalent to 25 kilotonnes of CO_2 emissions.

ADAPTING TO CHANGE

Climate change adaptation must also play a part in the global response. The effects of a changing climate can be visibly felt across the African continent – with altered water levels, shrinking forests and soil erosion evolving at an alarming speed. East Africa is currently experiencing its worst drought in 60 years. Climate scientists suggest the frequency and duration of these events will continue to increase over time, highlighting the need for countries to develop climate resilience.

> **“66 affordable homes for employees have been built from the gypsum waste.”**

Anglo American and BHP Billiton have developed an award-winning partnership with the eMalahleni municipality in South Africa to address water shortages and mitigate the threat of pollution. The eMalahleni Water Reclamation Plant – situated in the Witbank coalfields of South Africa's Mpumalanga province – has successfully harnessed the power of coal mining for a sustainable and socially beneficial outcome.

Originally developed to address operational, safety and environmental challenges, the plant desalinates rising underground water from Anglo American Thermal Coal's Landau, Greenside and Kleinkopje collieries, as well as from the closed BHP Billiton South Witbank coal mine. It not only prevents polluted water from entering local rivers, but treats 30 megalitres of potable water each day, the bulk of which is pumped directly into the municipality's reservoir. This meets about 12 per cent of the city's water needs.

A daily by-product of the water reclamation is 200 tonnes of gypsum-based solids, and this has been used successfully to make bricks. So far, 66 affordable homes for employees have been built from the gypsum waste and it is hoped that it will soon be expanded to a total of 300 residential units. The project has been recognised as an example of good practice in public-private sector partnerships by UNFCCC.

MOVING FORWARD

Climate change responses must not have an adverse effect on the social and economic development goals of African countries. Instead the measures must complement sustainable economic growth and poverty reduction while enhancing countries' readiness to adapt to climatic changes. This means that policies may vary country to country, or even within a country.

ICMM members are committed to working with African governments to develop robust policies and regulations that are appropriate for the local context. The Council advocates an approach that helps both exposed populations and industries in this transition, and encourages the development and use of low-carbon technology.

Effective climate policy can only be implemented in partnership: neither governments, companies, nor civil society can solve these challenges alone.

Dr R Anthony Hodge is the President of the International Council on Mining and Metals (ICMM). An appointed Professor of Mining and Sustainability at Queen's University, Canada, he has previously been the President of Friends of the Earth Canada. He served on the National Round Table on the Environment and the Economy (NRTEE) from 1992-1996. Through 2001 and 2002 he led the North American component of the Mining, Minerals and Sustainable Development (MMSD) project, a multi-stakeholder research initiative that examined the role of mining, metals and minerals in a sustainable future.

The **International Council on Mining and Metals** (ICMM) was established in 2001 to improve sustainable development performance in the mining and metals industry. Today, it brings together 21 of the world's largest mining and metals companies as well as 32 national and regional mining associations and global commodity associations. Our vision is one of leading companies working together and with others to strengthen the contribution of mining, minerals and metals to sustainable development.

ICMM, 35-38 Portman Square
London W1H 6LR, UK
Tel: +44 (0)20 7467 5070 | Email: info@icmm.com
Web: www.icmm.com

AIE
African International Energy

African International Energy – a partner in the climate change challenge

Climate change is one of the greatest challenges facing the world today. African countries contribute much less greenhouse gases (GHGs) on a per capita basis than elsewhere. However, despite this, Africa is likely to be disproportionately affected by the impacts of climate change, and these impacts are already unfolding.

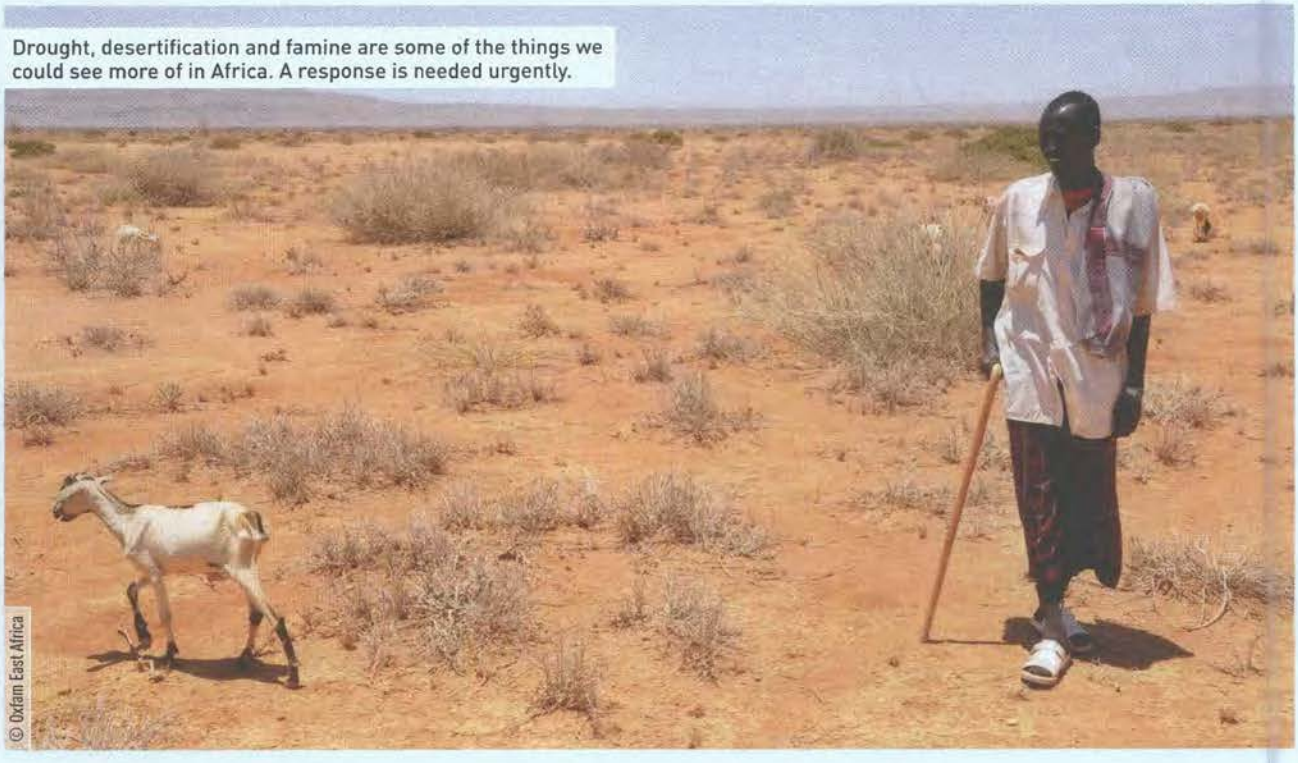
CLIMATE CHANGE AND ITS IMPACT

Africa is warmer than it was 100 years ago, and temperatures are much higher in some areas: as much as 3.5° in the past 20 years alone. There will be dramatic increases in rainfall (as much as 20 per cent in some areas), and more frequent and intense tropical storms. Agriculture fed by rain could drop by up to 50 per cent by 2020. Floods, droughts, desertification and famine are some impacts to be expected. Altered weather patterns and climate extremes will threaten agricultural production and food security, health, and water and energy security. This will undermine Africa's ability to grow and develop. Due to a lack of capacity to cope with the physical, human and socio-economic consequences of climate extremes as well as a strong reliance on natural resources for livelihood, Africa is most susceptible to climate change. Climate change could endanger the lives and livelihoods of millions of Africans, and hindering its economic growth and social progress.

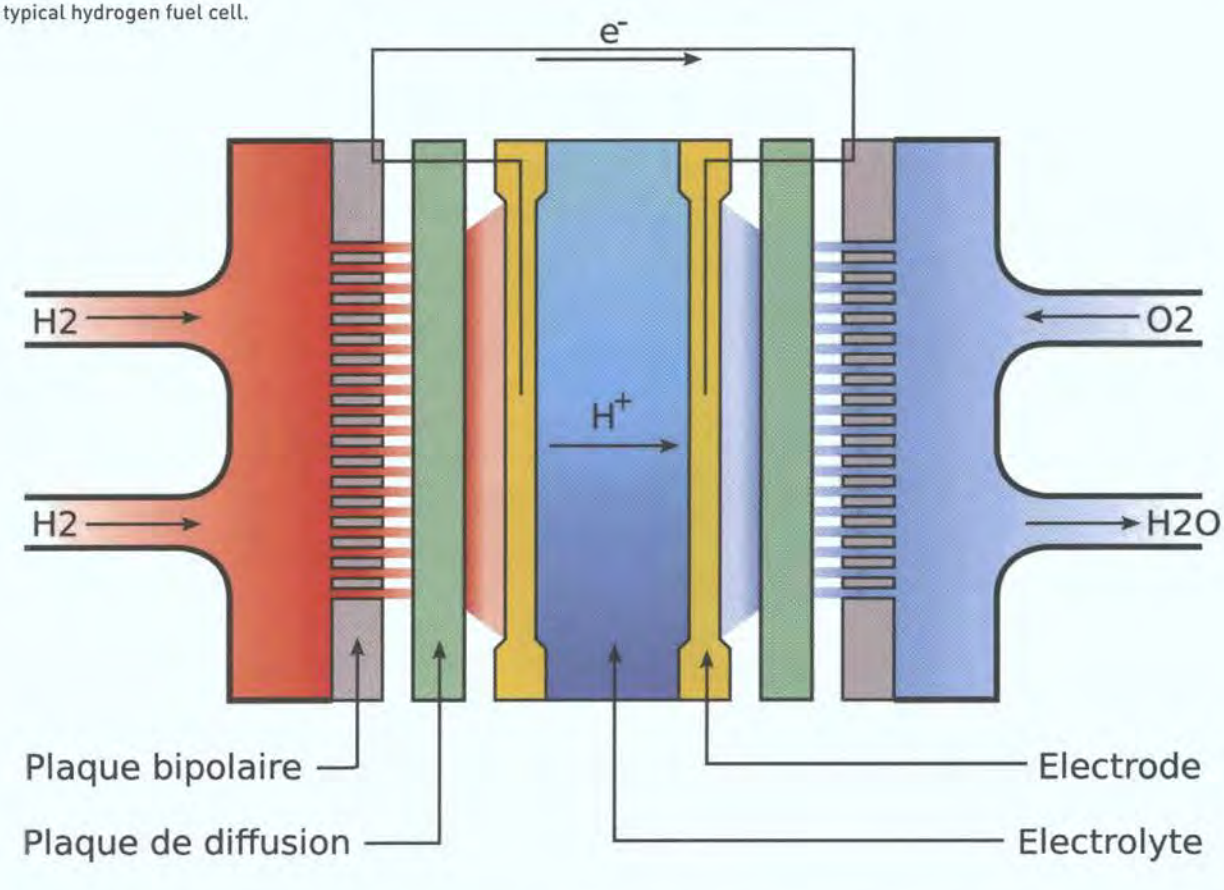
AFRICA'S RESPONSE TO THE CHALLENGE

African countries should participate in international efforts to reduce GHGs, not because of high regional emissions (these are only three per cent of global emissions), but because pursuing renewable energy implementation alternatives is the most cost-effective method to deliver energy access in under-serviced areas, and to reduce energy poverty. This will shield Africa from the calamitous economic impacts of climate change, and foster the economic growth that is so urgently required in some regional economies. The long-term benefit of affordable pricing – because of low operational costs – makes this the best option. New and renewable sources of energy will play a crucial role in the promotion of sustainable development, and in the transition to a low-carbon economy in Africa.

Drought, desertification and famine are some of the things we could see more of in Africa. A response is needed urgently.



A typical hydrogen fuel cell.



© Nécropotame

EXISTING ENERGY DEFICITS AND DIFFICULTIES

Many positive outcomes are possible, if the right policy options are adopted. Africa is extremely rich in renewable resources, which could benefit most of its people in a relatively short time – if exploited in an effective, clean and renewable manner. However, African governments have been unable to do this. More than 80 per cent of Africa's one billion people are without electricity. In some countries, as little as five per cent of the population have direct access to electricity. The proportion of people with electricity is lower in Africa than any other continent.

AIE PLC – PUTTING AFRICA ON THE PATH TO RECOVERY

African International Energy PLC (AIE PLC) is an international energy and electricity generation company, with a strong focus on providing reliable revolutionary energy solutions to the African market. With offices in London and Johannesburg, AIE PLC maintains close ties with investors, while remaining connected to ongoing electricity and energy projects in African countries.

HARNESSING AFRICA'S ELECTRICITY AND ENERGY POTENTIAL

Future energy and electricity demands must have less impact on the climate and environment, and with a minimal burden on struggling regional economies. Our company endeavours to research and utilise the most effective electricity and energy solutions, given growing environmental concerns and economic restraints.

OUR ENERGY SOLUTIONS

AIE PLC's electricity generation and energy solutions for Africa will be delivered through effective and skilful use of a variety of conventional and renewable technologies, with an interest in developing fuel cell technologies and an array of renewables such as wind, solar and hydro-electric power. We will also look to develop coal gasification and turn it into a viable green energy solution.

Our company's involvement with electricity generation and development of the electricity infrastructure will proudly identify us with the clean energy movement. AIE PLC is the sensible and responsible way forward, and is ready to help Africa join international efforts to reduce GHGs, to reduce poverty, and to increase regional economic growth.

Aldworth Mbalati, Director
African International Energy plc
2nd Floor West Tower, Nelson Mandela Square, Maude Street
PO Box 785553, Sandton 2146, Johannesburg, South Africa
Tel: +27 (0)11 881 5695 | Fax: +27 (0)11 881 5611
Email: aldworth@aie-plc.com | Web: www.aie-plc.com

Thames House
Portsmouth Road, Esher, Surrey KT10 9AD, UK
Tel: +44 (0)1372 465330

Adaption to climate change: an African perspective

© NASA

Africa urges developed countries to be more ambitious in their emissions reduction commitments.

By **Youba Sokona**, Co-ordinator, African Climate Policy Centre (ACPC)

According to climate scientists, global temperatures have increased by an average of almost 1°C since the pre-industrial times. This, as confirmed by the Intergovernmental Panel on Climate Change and leading national science academies, is largely due to anthropogenic (human-produced) emissions of greenhouse gases. It is also important to underscore that Africa is expected to experience about one and a half times as much warming as the global average. Anthropogenic emissions of greenhouse gases and the consequent rise in their concentration in the atmosphere in turn result in sea level rise, and frequent extreme weather events such as droughts and flooding. The international community has agreed to contain the increase in temperature at about 2°C above that of the pre-industrial period. To achieve this, developed countries should commit to make significant reductions in their greenhouse gas emissions. Indeed, without rapid cuts in emissions to keep global warming to its lowest possible level, adaptation may be impossible in some parts of the world where it is vitally needed.

It is now widely recognised and accepted that in Africa, climate change will hamper the ability to adequately fulfil the basic needs of populations, including access to food, clean water, energy, and public health. Adaptation in Africa is therefore a matter of survival. Concomitantly, adaptation offers the chance to manage, spread risk and increase choices, thereby contributing to sustainable development while dealing with the underlying threats.

But reality tells us that any reduction of emissions by developed countries alone will not be enough to achieve this less ambitious target; hence, developing countries should also embark upon such reductions. The dilemma is that developing countries, such as those in Africa, have other pressing priorities – such as bringing people out of poverty and meeting their development objectives. In addition, Africa as a continent contributes negligibly to total global greenhouse emissions. Yet the scale of the impacts of climate change on Africa and its poor will be devastating and will certainly be more significant in the future under a business-as-usual scenario.

GLOBAL ACTION ON MITIGATION AND ADAPTATION

The implications of climate change on development make both mitigation and in particular adaptation essential to dealing with climate change at the global level. It is worth highlighting here that the Kyoto Protocol represents the only international instrument incorporating legally binding emissions limitation and reduction commitments for developed countries, and therefore should be allowed to continue after 2012, but in a much enhanced form.

> **“The Clean Development Mechanism (CDM), has miserably failed in Africa.”**

Africa therefore urges developed countries to be more ambitious than they have been so far in their emissions reduction commitments, if we are to remain in line with the 2°C goal agreed in Cancun. Moreover, the rules of the Kyoto Protocol such as those on land use, land use change and forestry, force majeure, and additionality should be tightened to ensure environmental integrity. One of its flexibility mechanisms, namely the Clean Development Mechanism (CDM), has miserably failed in Africa, and as a result we are yet to see its benefits. Africa therefore urges the world to make the necessary reforms with a view to ensuring that CDM projects have equitable geographic distribution and that the reduction commitments by developed countries are not too diluted by offsets.

It is to be noted further that the Bali Action Plan calls for consideration of Nationally Appropriate Mitigation Actions (NAMAs) by developing countries. In the Copenhagen Accord, developing countries have agreed to develop and implement NAMAs. This agreement is also reiterated in the Cancun Agreements. Whether NAMAs will be taken up by developing countries is contingent upon the size of support, financial, technological and capacity development provided by developed countries. Several countries in Africa have submitted their NAMAs to the secretariat of the United Nations Framework Convention on Climate Change.

“Africans are forced to adapt to climate change, using their precious and limited domestic resources, with little international support.”

Africa calls upon all developed countries which are historically responsible for this problem to take enhanced actions to finance, and support in other ways, these NAMAs which are an essential part of efforts targeted to contain the average temperature increase below 2°C above the pre-industrial.

ADAPTATION IS CRITICAL FOR AFRICA

But the critical point of action for Africa remains on adaptation. Whereas incentives are required to mobilise individuals, firms and countries into climate friendly activities, such is not the case regarding adaptation. Adaptation is not a choice. It is much more basic and fundamental than that. It is what allows for livelihoods to be sustained and ecosystems to be protected. Ultimately, it is about survival and the continuation of life as we know it. Africa is already adapting the best it can, at high cost, to current and expected climate change. Africans are forced to adapt to climate change, using their precious and limited domestic resources, with little international support. It is a matter deeply rooted in ethics, equity and justice that developed countries should provide timely and adequate resources (in terms of finance, technology and capacity building) to fulfil their obligations in supporting African countries deal with the effects of climate change.

In Copenhagen, developed countries declared their commitment to provide ‘new and additional’ fast-start financial resources amounting to US$30 billion over the period 2010-2012 with ‘balanced allocation’ between ‘adaptation and mitigation’, also to be scaled up to US$100 billion/year in 2020. This commitment was further reinforced at the Cancun climate talks. However, preliminary analyses show that a significant part of the resources reported to have been provided to developing countries is not ‘new and additional’. Much of it is simply official development aid (ODA) repackaged as climate finance. Furthermore, the pace of disbursement of funds has been frustratingly slow, amounting to less than 10 per cent so far, with only one year left for the fast-start financing period. Therefore, Africa calls upon the developed countries to be true to their word and deliver on their commitments to provide enhanced support to help African countries in their response to climate change challenges.

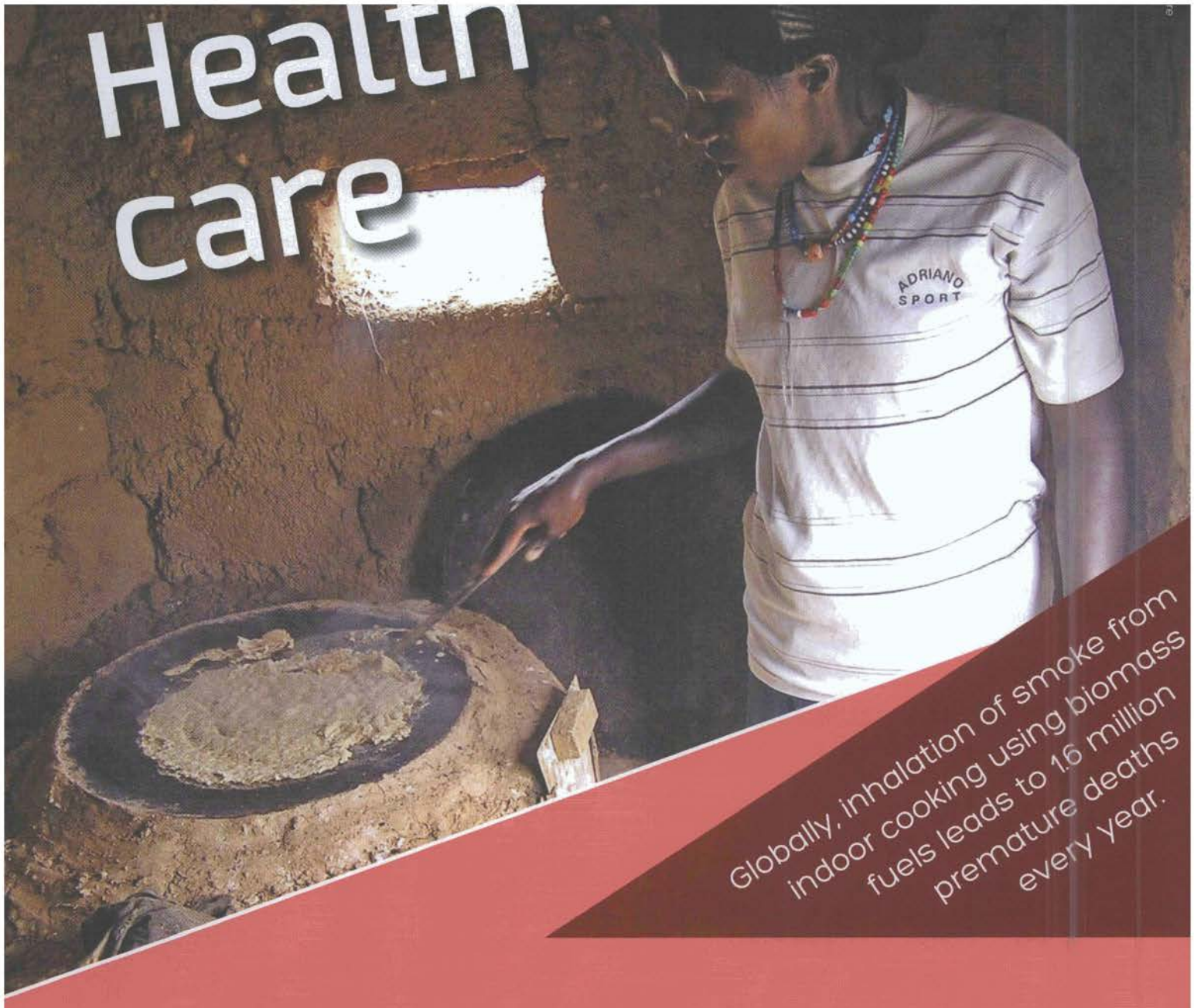
In conclusion, climate change is real. It is occurring. Africans are on the frontline of this momentous battle for survival, grappling with the effects of climate change on a daily basis, and indeed have been doing so for some time now. Needless to say that Africa has contributed little to the concentration of greenhouse gas emissions. Yet Africans are willing to share the burden of taking mitigation actions and follow a low carbon development pathway. This willingness for action needs to be globally shared. Indeed, it should be deeply rooted in just, equitable and respectful international relations that developed countries should: assume ambitious mitigation targets to contain the increase in temperature to below 2°C above pre-industrial levels; provide resources to help Africa adapt to the effects of climate change; and provide resources to help Africa in its mitigation efforts and low carbon development path.

Dr Youba Sokona is the Co-ordinator of the African Climate Policy Centre (ACPC) based in the United Nations Economic Commission for Africa. He is also a co-chair of IPCC Working Group III. Dr Sokona was the Executive Secretary of the Sahara and Sahel Observatory (OSS) from June 2004 to May 2010. A citizen of Mali, he focuses on the energy, environment and sustainable development nexus and he has broad experience in Africa in policy development. Before joining OSS, he worked for the Environnement et Développement du Tiers Monde, based in Dakar, Senegal. Before that, he served as professor at Ecole Nationale d'Ingenieur of Bamako in Mali. Throughout his career, Dr Sokona has served in various advisory capacities to African governments. He has published several books and articles on the issues of energy, environment and development with a focus on Africa.

The **African Climate Policy Centre** (ACPC) is a joint initiative of the African Union Commission, the African Development Bank and the United Nations Economic Commission for Africa. It was established in 2010 to serve as the knowledge-management and policy-facilitation arm of the Climate for Development (ClimDev) Africa Programme. Its goal is to become a credible knowledge hub, effectively contributing towards poverty reduction through successful adaptation to, and mitigation of climate change impacts in Africa; and improving the capacity of African countries to participate effectively in multilateral climate change negotiations.

United Nations Economic Commission for Africa
African Climate Policy Centre
PO Box 3001, Addis Ababa, Ethiopia
Tel: +251 11 551 7200 | Fax: +251 11 551 0350
Email: acpc@uneca.org | Web: www.uneca.org/acpc

Health care



Globally, inhalation of smoke from indoor cooking using biomass fuels leads to 1.6 million premature deaths every year.

efficient cook stoves combat climate change by cutting black carbon emissions, and also reduce risks of respiratory and other diseases

UNEP

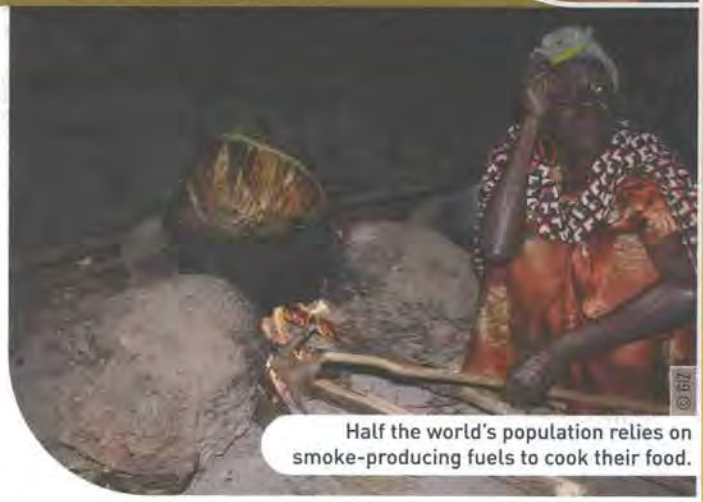
www.unep.org

GREEN ECONOMY: POWERING CLIMATE SOLUTIONS

Clean cookstoves: small intervention, transformational change

By **Radha Muthiah**, Executive Director, Global Alliance for Clean Cookstoves

Two million people around the world die annually from the seemingly simple task of cooking for themselves and their families – because each day nearly three billion people rely on solid fuels such as coal or biomass to power their open fires or rudimentary cookstoves. These are fuels that cause disease, injury and pollution through the toxic smoke they emit. The Global Alliance for Clean Cookstoves – with over 175 partners and growing – was formed last year to save lives, improve livelihoods, empower women and combat climate change by creating a thriving global market for clean and efficient stoves and fuels.



Half the world's population relies on smoke-producing fuels to cook their food.

Every day, nearly half the world's population is exposed to smoke emitted from traditional cookstoves and open fires – or, put another way, relies on smoke-producing fuels such as coal, wood, dung or charcoal to cook their food. The toxic smoke emitted from polluting and inefficient cooking can fill homes that often have little or no ventilation, and can cause life-threatening illnesses, such as cancers, diseases of the heart and lungs, pneumonia and tuberculosis. Other disabling injuries like blindness and burns can also occur.

HOUSEHOLD AIR POLLUTION

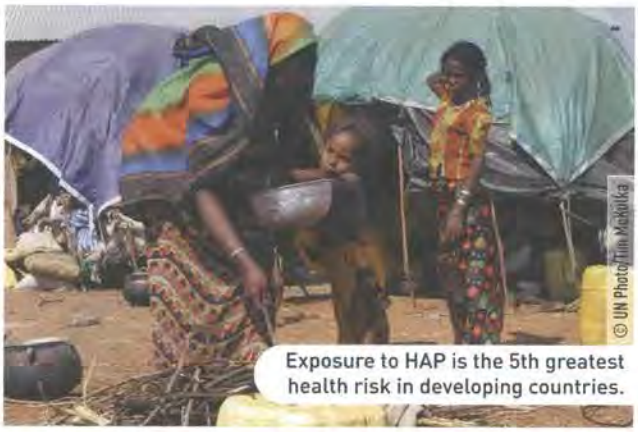
Because of its wide-ranging consequences, World Health Organization (WHO) research has concluded that household air pollution (HAP) is the fifth greatest health risk in developing countries. Using the same geographic standard, HAP is the leading risk-factor for non-communicable diseases (NCDs) among non-smoking women.

TABLE 1. SOLID FUEL USE AND ANNUAL DEATHS FROM HOUSEHOLD AIR POLLUTION

Country (Alliance member)	Percentage of population using solid fuels	Total deaths attributable to solid fuel use
Burkina Faso	>95	16,500
Ethiopia	>95	72,400
Kenya	63	14,300
Lesotho	83	200
Nigeria	67	95,300
Rwanda	>95	12,500
Tanzania	>95	18,900

Source: WHO, 2009

Household air pollution increases the chance of delivering low birth-weight infants, who, if they survive early childhood, are at a greater risk of developing an NCD in their lifetimes. It is also a major risk factor for acute lower respiratory infections, including pneumonias, which are responsible for 20 per cent of child mortality worldwide. Victims of HAP are predominantly women and children.

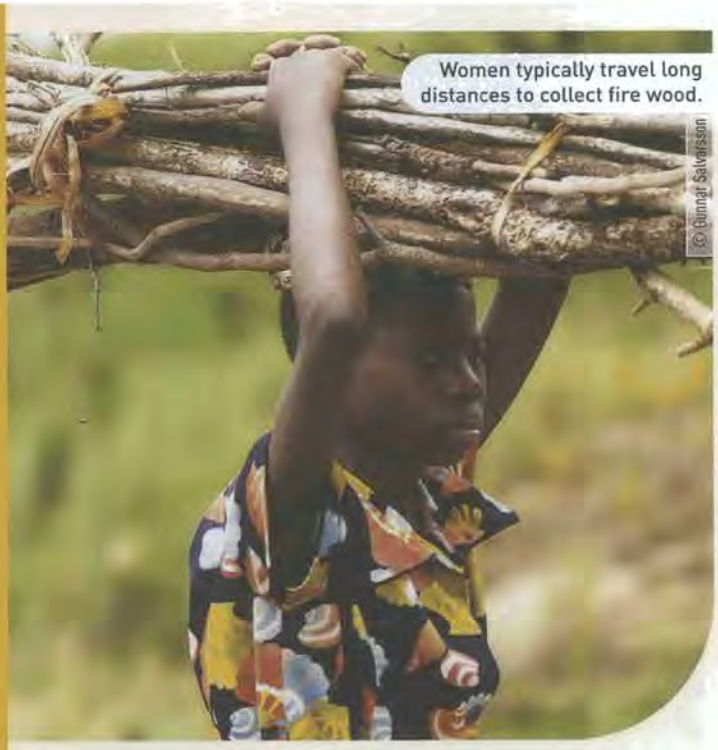


Exposure to HAP is the 5th greatest health risk in developing countries.

In Africa, exposure to HAP is particularly severe. Analysing 2009 data, WHO discovered that 95 per cent or more of the population in over 20 nations throughout the continent relied on solid fuels. Among the seven African nations that are part of the Global Alliance for Clean Cookstoves, according to the same data set, more than 230,000 people were killed from complications related to HAP.

IMPACT ON CLIMATE

Burning solid biomass significantly impacts the external environment and global climate, from fuel collection through the cooking process. Women and children typically



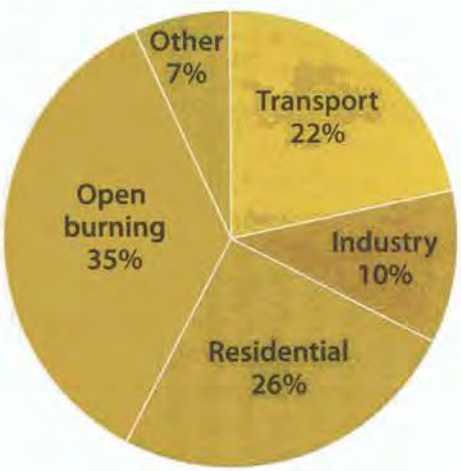
Women typically travel long distances to collect fire wood.

© Gunnar Salvarsson

travel long distances each day, sometimes taking hours and jeopardising their own safety, to collect fuel for cooking. Wood is one of the most abundant forms of biomass available around the world, but the deforestation that occurs from its removal can cause landslides that devastate towns and destroy arable soil for agricultural purposes. Additionally, the time spent gathering fuel is time that could be better spent on income generation, educational opportunities and other productive activities.

Open fires and rudimentary cookstoves are also inefficient at converting energy to heat for cooking. In developing countries, about 730 million tonnes of biomass are burned every year, amounting to more than one billion tonnes of carbon dioxide (CO_2) emitted into the atmosphere. And though not a direct fuel-to-fuel comparison, a WHO study from 2007 notes that the amount of biomass fuel needed each year for basic cooking can reach up to two tonnes per family, compared to just 0.2 tonnes for a family cooking with an alternative fuel such as liquefied petroleum gas (LPG).

Figure 1. Global black carbon emissions.



(Global: 7,500 ktonne)

Source: Bond, 2010

Other pollutants emitted from these forms of inefficient cooking, such as black carbon and methane, have short life spans but long-lasting consequences for the climate. Over 25 per cent of global black carbon emissions, which occur from incomplete combustion, come from the residential sector. In a 2009 *Black Carbon e-Bulletin* from UNEP, Dr Veerabhadran Ramanathan estimated that black carbon contributes the equivalent of 25 per cent of CO_2 warming globally, in some regions even reaching as high as 60 per cent.

These types of massive energy disparities are at the heart of the urgent need to develop a market for clean cookstoves and fuels.

ALLIANCE INITIATIVES IN AFRICA

The Global Alliance for Clean Cookstoves has prioritised its work in Africa in several ways. It is currently co-funding a WHO/US Centers for Disease Control and Prevention evaluation of the acceptability, health impact and sustainability of clean cookstove and fuel options in the Nyanza Province of Kenya, where the mortality rate for infants and children under the age of five is twice the national average – the highest in the country.

Additionally, the Alliance has commissioned market analyses around the world to identify opportunities for interventions that can help build commercially-sustainable clean stove businesses, including assessments in Ethiopia and Nigeria. These assessments provide a fresh perspective on the barriers to successful scaling-up of clean stove projects, and will help identify areas of co-operation between different actors in this space that will allow the cookstove sector, over time, to move away from donor-dependent initiatives towards thriving local, regional and global businesses that supply customers community-wide.

Almost one-third of the Alliance's national partners are in Africa to date. In addition, implementing partners are working on projects across the continent to help the Alliance reach its ambitious but achievable goal.

ALLIANCE PARTNER PROFILES
MAASAI STOVES AND SOLAR PROJECT

The Maasai Stoves and Solar Project, created by the non-profit International Collaborative for Science, Education, and the Environment (ICSEE), has emphasised the incorporation of women in its efforts to deploy clean cookstoves in northern Tanzania.

Active involvement of local residents in making, distributing and installing stoves has brought together women, craftspeople, small businesses and merchants in each new village. The cost of a single stove is about US$55; $40 goes to brick makers, steel merchants, materials suppliers and transport costs, while the team of women who build and install the stoves and train other women on proper usage gets $15. The procurement and distribution of stoves under the Maasai Project is designed to create jobs and significantly stimulate the local economy.

Improved air quality and fewer hours lost gathering fuel are additional positive benefits of the project. Particulate

and carbon monoxide monitors show that the new stoves cut indoor smoke by 90 per cent. The stoves also reduce the amount of wood use by 60 per cent, thereby saving 12 to 15 hours a week of wood-gathering for the women and children of each household.

IMPACT CARBON

In Uganda, Impact Carbon is working to shift the country towards widespread adoption of efficient, healthy cookstoves that reduce charcoal and wood use by 35 to 65 per cent and save families more than US$75 per year.

The Ugandan project has identified and developed a market for stoves, troubleshooting manufacturing and distribution problems and finding financing for producers and consumers. Carbon finance has now provided hundreds of thousands of dollars in subsidies to poor consumers and facilitated the distribution of more than 95,000 efficient stoves to date. The project has other ancillary benefits such as supporting the development of local, sustainable manufacturing enterprises and spurring small and medium enterprise (SME) growth in the retail sector.

THE WORLD BANK

Building on lessons learned from its Lighting Africa programme, a joint World Bank-IFC initiative that facilitates private sector led uptake of off-grid lighting solutions in sub-Saharan Africa, the World Bank has launched a new programme, the Africa Clean Cooking Initiative, to stimulate the development and commercialisation of a new generation of clean cookstoves in sub-Saharan Africa.

The initiative aims to develop a large-scale, market-driven programme to promote the dissemination of advanced, improved stoves and the sustainable production and supply of fuel to benefit the majority of African households reliant on solid biomass for cooking.

The Africa Clean Cooking Initiative will be designed to leverage new technology and market developments, partnerships, and financing mechanisms that could enable the private sector to address existing market barriers to dissemination and scaleup, leading to consistent improvements in design, performance, and affordability of stoves with a focus on adaptability and local needs. The alignment of market and consumer incentives in the initiative can reduce inefficient production and use of biomass, reducing the impact on natural resources and on climate.

CONCLUSION

Cooking with toxic and polluting fuels over open fires and inefficient stoves is part of a vicious and complex cycle that significantly impacts the environment, human health and economic development. But it is one that can be broken. The benefits of affordable, accessible and culturally-appropriate clean cookstoves are clear: cleaner air; increased environmental sustainability; improved safety; enhanced livelihoods; and better health.

There is mounting evidence that smoke-producing biomass contributes to climate change at regional and global

Robert V. Lange, President of ICSEE, with members of the Maasai Project.

levels, indicating that efforts to mitigate climate change must take household energy issues into consideration. Clean-burning stoves can lessen the impact of climate change by improving the combustion efficiency of fuels used for cooking, and by reducing greenhouse gas emissions from the unsustainable gathering of biomass and coal.

As the Alliance celebrates its first anniversary this autumn with multi-million dollar financial commitments: strategic, sector-wide recommendations from 350 global experts; high-profile Ambassadors to help tell this story; and a growing roster of experienced and dedicated partners, it is uniquely positioned to address and arrest this silent killer in Africa and throughout the world.

Radha Muthiah is Executive Director of the Global Alliance for Clean Cookstoves. She has over two decades of experience successfully fostering partnerships and alliances in the for-profit and non-profit sectors, and developing and executing innovative business models to promote economic development. Muthiah holds an MBA from Stanford University.

The **Global Alliance for Clean Cookstoves**, launched in 2010, is an innovative public-private partnership dedicated to saving lives, improving livelihoods, empowering women and combating climate change. Led by the United Nations Foundation, the Alliance has set a '100 by '20' goal for 100 million homes to adopt clean and efficient stoves and fuels by 2020, towards the long-term goal of universal adoption. The Alliance's partners include 21 implementing and donor countries from five continents; private-sector companies; numerous project implementers and non-governmental organisations, many who work in Africa; and the United Nations, which has made a strong commitment to the Alliance through many of its agencies. The Alliance facilitated the Lima Consensus, a groundbreaking agreement among stakeholders regarding the development of a tiered, interim health and efficiency cookstove standard. The Alliance has also enhanced the technical capacity of regional stove testing centres in Ethiopia and China; supported the formation of regional alliances in Africa, Asia and Latin America; and worked to develop a monitoring and evaluation framework among its 11 expert working groups, in order to accurately and transparently reach its 100 by '20 goal.

Global Alliance for Clean Cookstoves
1800 Massachusetts Avenue NW, 4th Floor, Washington, DC 20036, USA
Tel: +1 202 650 5345 | Fax: +1 202 650 5350
Email: info@cleancookstoves.org
Web: www.cleancookstoves.org

SUNTECH
Solar powering a green future™

The power of access – solar powering 20 million lives

Since its founding in 2001, Suntech has changed the lives of one million people. By 2020 we aim to change the lives of 20 million more. Suntech's impact has been felt in more ways than just its technological and manufacturing leadership in the photovoltaic industry, it has also revolutionised peoples' lives by bringing them access to power, many for the first time. Over 10 years Suntech's installed base of solar panels has reached 5 GW across 80 countries around the world. Suntech is the first and only company to achieve this feat. 5 GW is equivalent to mitigating 3.78 million tonnes of CO_2 per year; similar to planting nine million trees or removing 1.5 million cars from the road.

Suntech's high-technology manufacturing process creates some of the best solar cells in the industry.

Suntech's products are built to deliver this power, both on and off the grid. At the cell level, we have taken efficiencies from 14 per cent in 2001 to 19.2 per cent in 2010 with our industry-leading technology. Suntech is constantly innovating to bring the best products to market. In addition to our highly efficient mono and polycrystalline cells, Suntech has also created SuperPoly and Cast Mono cells using a unique ingot manufacturing process that combines the best traits of mono and polycrystalline – improved efficiencies and lower manufacturing cost.

Our panels are built to last. From environments as hostile as the deserts of the Middle East, to the highest mountains in China, our panels are designed for adverse conditions and come with our industry leading product warranty and 25 year power guarantee. This commitment to reliability has helped Suntech become the number one manufacturer of solar modules globally.

Suntech has changed the world in 10 years, but that is only the start. Suntech's vision is to provide everyone under the sun access to nature's cleanest and most reliable energy resource, the sun. We know that by extending this technology we can reach everyone everywhere the sun shines. We believe in the power of solar to grant access and change people's lives – and nowhere is this power more clear than in solar's off-grid applications.

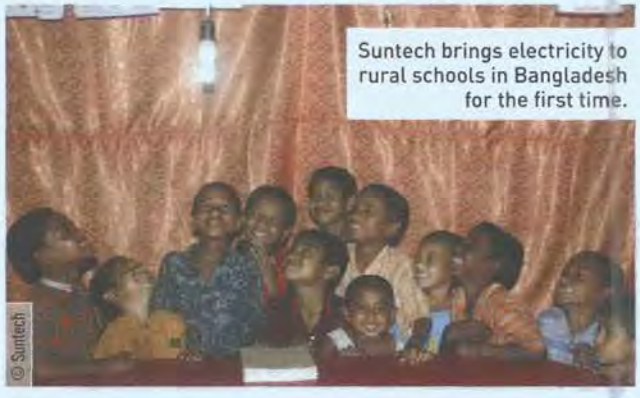
THE REVOLUTION OFF THE GRID

Across the world two billion people, one-third of the world's population, still remain without reliable access to power. Current energy sources often use expensive, polluting and hazardous fossil fuels, such as diesel and kerosene, to do everything from generating electricity to cooking dinner.

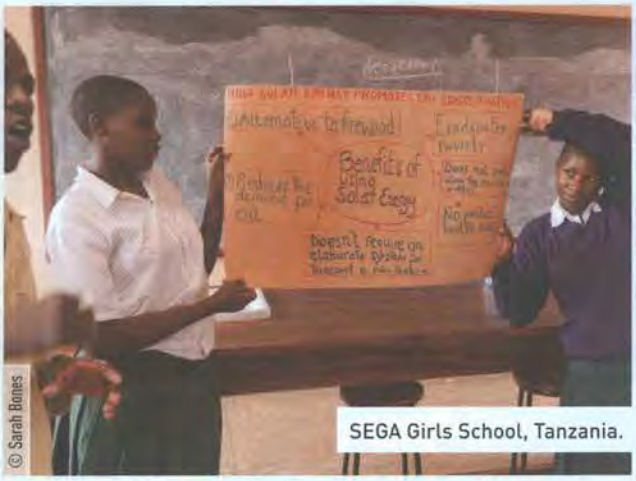
> **“Across the world two billion people, one-third of the world's population, still remain without reliable access to power.”**

Powering a renewable revolution for these people requires innovative weapons and creative solutions. Often there is a focus on an 'all-or-nothing' approach, either generating electricity completely through fossil fuels, or jumping to a total renewable solution.

Hybrid power generation, combing one or more types of fossil fuel fired generators, renewable technologies and batteries, is an often overlooked yet effective solution to bring access to power for those most in need. This is one of the tools that Suntech will use to empower 20 million people across the world.



Suntech brings electricity to rural schools in Bangladesh for the first time.



© Sarah Bones

SEGA Girls School, Tanzania.


© Suntech

Suntech provided a complete hybrid solution for a NGO project in Uganda.

CREATING AN EFFECTIVE HYBRID SOLUTION

Diesel powered generating systems need to run nearly constantly, taxing the electrical generating equipment leading to expensive repairs and elevated maintenance costs. This is the primary means of generating electricity for most off-grid regions.

Pairing a photovoltaic system with the diesel generator creates a system which can provide a stable and sustainable energy supply. The solar panels both provide power and a charge for the batteries during the day. The diesel generation can provide a strong source of power, especially during the night or on cloudy days. Solar's strength, however, is that it mirrors the peak demand curve of electricity consumption: solar provides the most power when it is most needed.

This whole process can reduce the amount of diesel used by approximately 60 per cent over the course of a year, substantially reducing fuel and maintenance costs. By the second year of operating a hybrid diesel system of this type, the savings from reduced fuel costs already provide a return on the investment of the system.

Hybrid power generation can make a large impact in the life of a local community. These systems can be incorporated into the existing diesel generation equipment of homes, hospitals or businesses. A hybrid mix can provide a stable, affordable and sustainable solution for these areas, one that reduces costs, noise pollution and is much safer to transport.

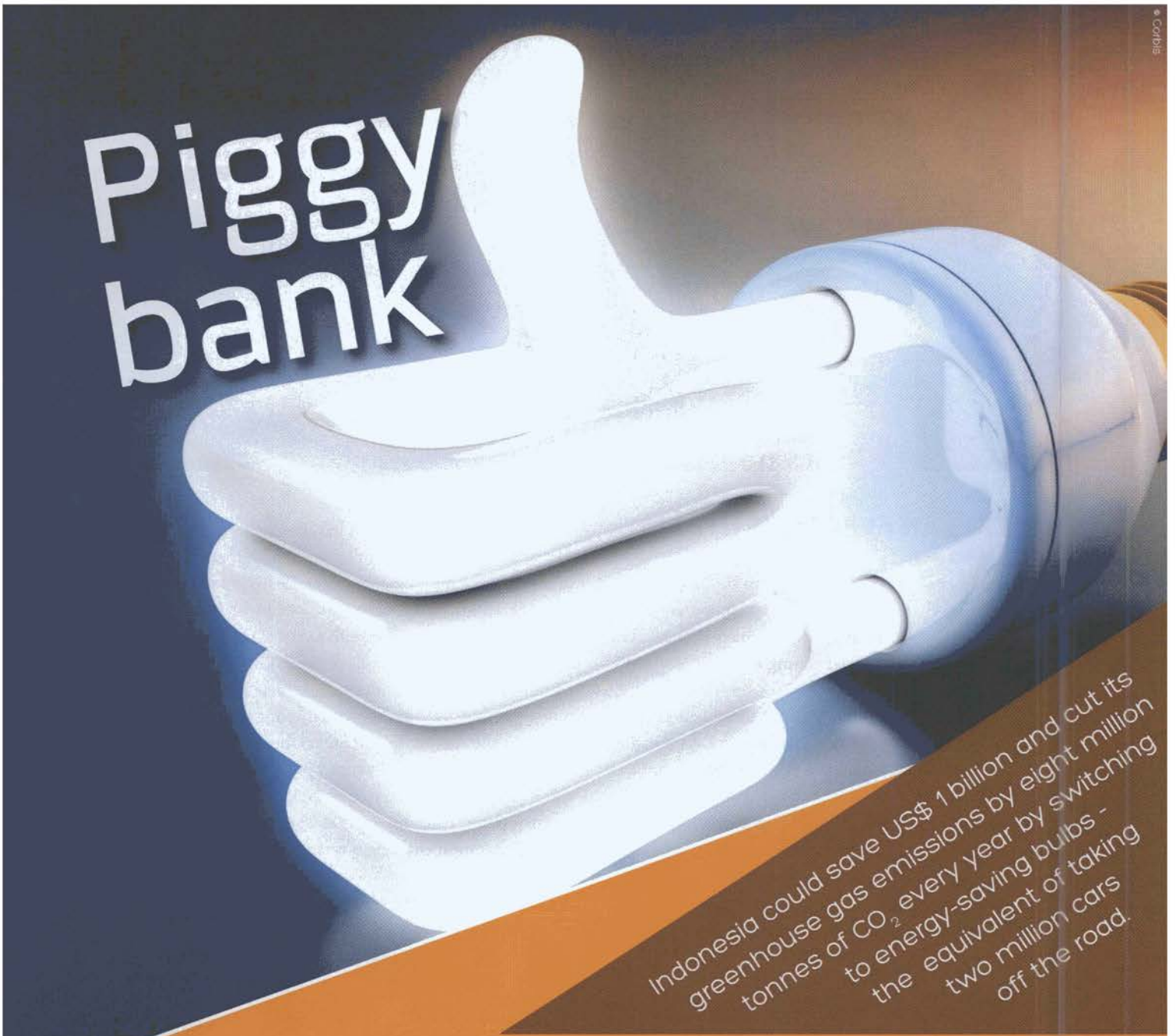
Mali, a landlocked country in Western Africa, sought just such a solution to reduce its costs and provide backup protection for its off grid water pumping station in Ouelessebougou city in the Koulikoro region of the country. The site originally had two diesel generators which together were able to generate 440 kW of electricity (220 kW each) to power the water pumping station and scores of surrounding houses. A 216 kWp solar panel installation was added to the existing system in order to provide additional power and reduce the operating expenses of the diesel system; the operating time of the diesel generators was reduced by 75 per cent. The Mali government was very enthusiastic about the success of the project, hoping to implement similar solutions in other areas of the country.

One product that Suntech has developed is the "Megawatt in a box". This solution can be put together and transported in one or two shipping containers. Delivered on site, it can easily be set up and quickly generate power. It can also be combined into a hybrid system as well. A version of this solution was used in Uganda for an NGO organisation with great success. This type of complete system, which can be customised based on the amount of energy needed as well as the specific requirements for the project, can be an important answer for off-grid power. A "Megawatt in a box" could be shipped to remote locations where grid infrastructure is lacking or areas where a quick solution to power generation challenges is necessary.

As over half the world's solar markets move past grid parity in the next three years, solar power will become the radical energy solution transforming people's lives, especially off the grid. Suntech will continue to provide the creative, cutting edge solutions to power an unlimited energy future for the entire world.

Dr Zhengrong Shi is Founder, Chairman and Chief Executive Officer of Suntech. From 1995 to 2001, he was a research director and executive director of Pacific Solar Pty Ltd, an Australian PV company engaged in the commercialization of next-generation thin film technology. From 1992 to 1995, he was a senior research scientist and the leader of the Thin Film Solar Cells Research Group in the Centre of Excellence for Photovoltaic Engineering at the University of New South Wales in Australia. Dr Shi is the inventor of 15 patents in PV technologies. Dr. Shi received a bachelor's degree in optical science from Changchun University of Science and Technology in China in 1983, a master's degree in laser physics from the Shanghai Institute of Optics and Fine Mechanics, the Chinese Academy of Sciences in 1986, and a Ph.D degree in electrical engineering from the University of New South Wales in Australia in 1992.

Suntech Power Holdings Co., Ltd
No.9 Xinhua Lu, New District Wuxi, China
Tel: +86 510 8531 8888



energy savings appliances not only combat climate change, they also save money and boost household budgets

www.unep.org

UNEP

GREEN ECONOMY: POWERING CLIMATE SOLUTIONS

106
The role of ICTs in adapting to climate change
Dr Hamadoun Touré
International Telecommunication Union

112
Transformative ICT solutions: a paradigm shift in Durban
Luis Neves
Global e-Sustainability Initiative

115
Supplier environmental certification and rating: the EPEAT experience
Sarah O'Brien
Jeff Omelchuck
Green Electronics Council

120
The challenge to green transport
Niels Beuck
Marco Leonardo Sorgetti
European Association for Forwarding, Transport, Logistic and Customs Services

123
Aviation's commitment to climate action
Tony Tyler
International Air Transport Association

STEPS TO SUSTAINABILITY

126
Enhancing sustainable energy in the Central American coffee sector
Vera Espindola Rafael
Britta Wyss Bisang
UTZ Certified

129
Safeguarding the environment with information disclosure
Ernst Ligteringen
Global Reporting Initiative

134
Decoupling economic development and waste generation
Dr Suzan Oelofse
Institute of Waste Management of Southern Africa

137
Biochar use: a productive alternative to carbon storage
Bruno Glaser
Martin-Luther University Halle-Wittenberg

142
Hydropower and climate change
Cameron Ironside
International Hydropower Association

145
Assessing the supply chain for efficient production, cost and reputation
Frances Way
Carbon Disclosure Project

Climate change adaptation – disaster response and Blackberry

THE US NATIONAL WEATHER SERVICE

The US National Weather Service (NWS) is a federal government agency of the National Oceanic and Atmospheric Administration. NWS meteorologists perform post-storm damage surveying, where they collect key data on storm events and ultimately update a national database for scientific, academic, commercial and public use.

THE CHALLENGE

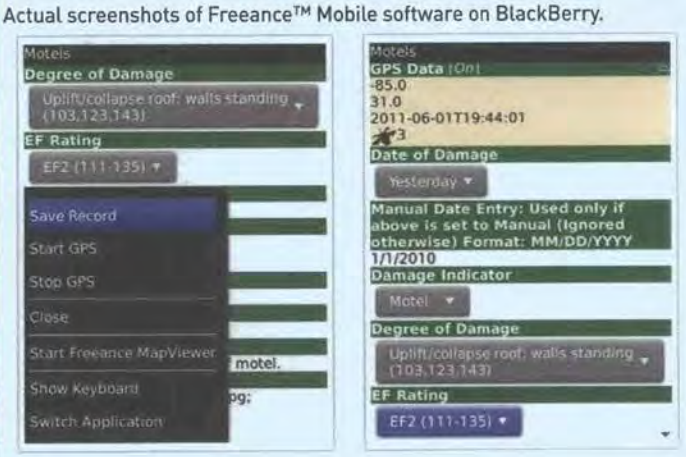
Surveying damage from severe storms is an important mission of the US National Weather Service (NWS). This labour-intensive work requires field surveyors to travel to storm sites and document the damage left behind by major weather events such as tornadoes. Areas to be surveyed can span lengths of 15 miles or longer. Surveyors would document data gathered at the storm sites using pen and paper.

Keith Stellman, Warning Coordination Meteorologist with NWS, says one major challenge of this field operation is maximising the accuracy of the collected data. "Surveying a tornado track can involve pages of handwritten notes, GPS co-ordinates, and calculations. Once notes are made, surveyors must travel back to the office to enter all of that data manually," Stellman explains. In the process of entering the information, detailed notes made at the scene are often summarised, and any details that weren't written down immediately can be forgotten.

THE SOLUTION

NWS implemented Freance™ Mobile software, developed by TDC Group Inc., to accelerate the data collection and data entry process on BlackBerry® smartphones in the hands of the surveyors. All relevant data pertaining to the damage survey can now be entered by surveyors right at the storm site using their BlackBerry smartphone.

Actual screenshots of Freeance™ Mobile software on BlackBerry.



Data entry is quicker and more consistent by way of a custom-built data collection form, which NWS built using Freeance Mobile software. On the data collection form, surveyors use drop-down and list menus for selectable data items, such as damage indicator type and wind speed range, as well as free-form comment fields for entering notes. Using the integrated camera on the BlackBerry smartphone, surveyors can take photographs of the damage to add to the event file. All data collected at the storm site is automatically time-stamped with GPS co-ordinates thanks to the GPS technology built into the BlackBerry smartphone.

> **"With the elimination of paper notes, data entry back at the office is almost eliminated."**

Data is then sent from the BlackBerry smartphone through the BlackBerry Enterprise Server, behind the firewall, and onto NWS's ESRI ArcGIS server. The back-end database on the ESRI server is used by government agency scientists, insurance companies and other interested parties throughout the country. With an interwoven web of stakeholders relying on the data, enhanced accuracy is an asset.

BENEFITS FOR US NWS

Being able to use BlackBerry smartphones to collect damage data at the storm site, with an electronic form that guides the surveyor through the data collection process, is helping to streamline field operations and the ensuing data flow for NWS. With the elimination of paper notes, data entry back at the office is almost eliminated, and there is virtually no time lag from the moment a surveyor enters data to the availability of that data on the NWS ESRI ArcGIS server. The ability to input data directly onto the electronic form at the storm site is a key contributor to enhanced data accuracy. "With no need to review handwritten notes or recall information after the fact, there is less likelihood that the collected information will be incomplete or incorrect," says Stellman.

Leveraging the automatic time-stamped GPS co-ordinates, calculations pertinent to the storm event can be

done faster or even automatically. This is an improvement on past procedures, where surveyors had to make manual calculations using GPS co-ordinates. "In most instances when you use Freance™ Mobile software and BlackBerry smartphones, once you leave the event site, your collection, calculating and reporting tasks are done," says Stellman.

Stellman says the BlackBerry solution has introduced a major leap forward in streamlining and standardising the collection of storm survey data for NWS.

R3SM INC.

R3SM Inc. (Recover, Rebuild, Restore Southeast Mississippi) is a non-profit organisation that supports efforts to repair and rebuild homes after natural disasters, from fires to floods and hurricanes. The organisation is an advocate for accessible housing, medical resources and employment for those who most need it, such as the elderly and disabled, and serves as a co-ordination point for recovery funds, resources and volunteer labour in damage assessment and rebuilding.

THE CHALLENGE

Like many non-profit organisations, R3SM has minimal staff and limited resources, but an overwhelming demand for services. Fifteen case-workers serve hundreds – sometimes thousands – of clients in 28 counties across Mississippi, who are dealing with the effects of catastrophic events. The job requires extensive travelling, particularly to rural areas that have no access to the internet. And, in disaster areas, case-workers often have to deal with power outages and downed phone lines. In these kinds of scenario, there is a critical need for communications and co-ordination in the field.

There is also a need to co-ordinate relief efforts with the organisation's partners, which include the United Way, the Salvation Army and American Red Cross. R3SM is currently working with its partners on a pilot programme for disaster case management that will be implemented across the US, requiring case-workers to have access to near real time information.

THE SOLUTION

"I had a BlackBerry smartphone at my previous job at American Red Cross, and that exposed me to the benefits," said Matthew Brumfield, Project Data Manager for R3SM. "When I started this job, I realised there was no way I could function without it." He also requires access to a national database called the Coordinated Assistance Network, which tracks client records across several non-profit organisations to avoid duplication of services. "My BlackBerry smartphone can access the database over the internet, while other smartphones won't," he said.

BENEFITS FOR R3SM

"I couldn't perform all the different roles I have without my BlackBerry smartphone," said Brumfield. "Without it, we would need two people to do my job. We're saving at least one person's salary annually – and that's enough money to build a house for one of our clients."

These efficiencies help the organisation's clients, who need access to resources as quickly as possible. For example, R3SM was given a government grant that serves 7,000 clients on a first come, first served basis. The faster that case-workers can pull up information relevant to a case and turn around the paperwork, the faster those clients will receive the resources they need to help them through a catastrophic event.

> **"We're saving at least one person's salary annually."**

Brumfield also uses his BlackBerry smartphone to communicate with volunteers and provide them with details of their lodgings, placement and activities. "We have groups coming from as far away as Canada, and we try to answer any questions they have as quickly as possible to get the ball rolling," he said. This is particularly important during a disaster situation, where time is of the essence.

Also, during a disaster situation, the BlackBerry smartphone is designed to provide case-workers with a highly dependable method of communications. "During a recent hurricane, we didn't have power for close to a month in my area, and phone lines were down," said Brumfield. "But I had my BlackBerry smartphone, which I used to send email to co-ordinate resources for relief efforts. The BlackBerry smartphone's long battery life makes it an invaluable tool for case-workers spending long hours in the field."

Operators also rely on the security features. For example, given that they deal with sensitive information such as social security numbers, the ability to wipe a lost or stolen device is critical.

Research In Motion
295 Phillip Street, Waterloo, Ontario, Canada N2L 3W8
Tel: +1 519 888 7465 | Fax: +1 519 888 7884
Email: corporateresponsibility@rim.com | Web: www.rim.com

Technology must be put at the forefront of our strategies to address climate change.

The role of ICTs in adapting to climate change

By **Dr Hamadoun Touré**, Secretary-General, International Telecommunication Union (ITU)

Even though the effects of climate change are already visible across the globe, there is still insufficient political will to move the agenda forward. Many innovative and efficient solutions are available to help 'decarbonise' the economy, however, providing a new approach to addressing this defining challenge. ITU has taken on the task of spreading the word about the role of information and communication technologies (ICTs) in tackling climate change. The next step is to assist governments in turning technological proofs of concept into mainstream applications, particularly in the case of climate change adaptation programmes. The key obstacle to identifying and implementing climate change adaptation strategies is that climate change affects each country differently. ICTs therefore play a fundamental role as basic infrastructure that allows decision-makers to be fully informed. The time is right to put technology at the forefront of our strategies to address climate change.

THE DEFINING CHALLENGE OF OUR TIME

Climate change is a truly global challenge. Despite the progress achieved by the global community since the 1992 Earth Summit, aimed to develop a better understanding of the need to balance the three pillars of sustainable development (social, economic and environmental), the truth is that this improved understanding has not yet been mainstreamed into a new model of sustainable growth and prosperity. With emission levels on the rise coupled with the underlying complexity of implementing the United Nations Framework Convention on Climate Change (UNFCCC) – one of the three conventions opened for signature in Rio in 1992 – these two challenges reflect the need to be more ambitious and to work together to ensure the livelihood of our planet.

Political will, however, is still lacking, however much we can already see the effects of climate change. Commitments and compromises are needed from all stakeholders to establish the framework that will assist in the transition towards a greener society, particularly at a time of

precarious financial and economic prospects. In this context, looking for someone to blame or waiting for volunteers to take the first steps is unlikely to be the right approach. Climate change is already impacting areas such as food production, water supply and disease proliferation. The risks of inaction are real, and we do not have time to waste.

ICTS ARE PART OF THE SOLUTION

Every aspect of the modern world has become increasingly integrated with ICTs, which have become a positive force of transformation and a crucial element in our everyday lives. ICT's are now basic infrastructure that also expands access to key public services, such as health, education and government services, with widespread implications on our social and economic development. New approaches are now available to 'decarbonise' our lifestyles, bringing efficient solutions to a complex problem.

> **“Looking for someone to blame or waiting for volunteers to take the first steps is unlikely to be the right approach.”**

Over the past few years ITU has been raising awareness about the innovative applications through which ICTs can help address climate change. From climate monitoring to reducing greenhouse gas (GHG) emissions, from adaptation to facilitating the development and transfer of technologies, ICTs enable sustainable development and allow for the more efficient use of resources, and in particular energy. Key advances promoted by ITU have improved collaboration between the ICT industry and the public sector in knowledge and best practices exchange, as well as the development of a standardised methodology to measure the contribution from the ICT sector in reducing global GHG emissions.

It then becomes necessary to provide help for governments and institutions as they put technologies at the service of the global community. Turning proofs of concept into mainstream applications is best done with a central understanding of global progress – particularly in the case of climate change adaptation.

ICTS AS THE BUILDING BLOCKS FOR ADAPTATION STRATEGIES

However, climate change has different effects in different parts of the world, necessarily affecting adaptation strategies in a wide variety of ways. Some countries will experience changes in rainfall patterns, for example, while others will be affected by rises in sea level and the loss of coastal areas.

ICTs can therefore play a fundamental role in delivering the key information in helping planners to take informed decisions, based on a better understanding of impacts and vulnerabilities. ICTs today are basic infrastructure which supports the collection and sharing of data in near real time. Through the use of ICTs, teams on the ground can also better co-ordinate with each other, speeding up actions at the local level and promoting community engagement.

The use of ICTs to predict, detect and alert us in the case of natural disasters is one of the best examples of the use of information systems in climate change adaptation. Across the world, ICT networks are already in use providing early warning of changes in climate, allowing governments to better respond to natural disasters. This is an area in which ITU is providing strong support to our member states, with projects being implemented at the country level. Similar approaches could be adopted to protect key sectors such as agriculture or energy production.

> **“ICTs today are basic infrastructure which supports the collection and sharing of data in near real time.”**

Health, education and government services are also being transformed by ICTs. The use of technology is dramatically improving the dissemination of information, allowing students to be trained wherever they are, patients to be treated by doctors remotely, or citizens to access public services from their mobile phones. Although such examples are not specific to climate change adaptation, many of these applications will strengthen existing initiatives to build resilience to climate change.

UNLEASHING CROWD POTENTIAL

The world is already being transformed through ICTs, through both national programmes and grass-roots initiatives. In several countries ICTs are being used to monitor food supplies, mapping agricultural production and helping to predict food shortages. Monitoring environmental and soil conditions through accurate sensors and telemetry units helps to protect agricultural products from the forces of nature, and maximises output in less fertile areas. Similarly the use of 'smart' meters and grids improves efficiency in the use of limited resources, such as water or energy.

Connectivity is bringing a new dimension to decentralised collaboration. We are all witnessing the power of the internet and social networks to connect people, enabling them to work together, overcoming physical or cultural barriers. Imagine the benefits that these networks could bring if used to articulate responses to climate change? Prominent examples have already been applied in the use of software to engage thousands of individuals in response to natural disasters, such as the 2010 Haiti earthquake, in which technology played a key role in 'crowd-sourcing' action on the ground.

© Ikuvaner

Communications technology alongside a traditional village in Africa.

WHAT'S NEXT: MOVING FORWARD

The world will have two unique opportunities over the next few months to move the sustainable agenda forward; the 2011 COP17, taking place in Durban, South Africa, and the 2012 United Nations Conference on Sustainable Development (Rio+20), taking place in Rio de Janeiro, Brazil. Although the outcomes are difficult to predict, one thing is very clear: business as usual is no longer an option if we want to ensure the livelihood of our planet. The future demands a shift towards a greener and more sustainable model of development.

> **“Although the outcomes are difficult to predict, one thing is very clear: business as usual is no longer an option.”**

The challenges are enormous, but so too are the opportunities. Today, according to ITU data, there are well over five billion mobile cellular subscriptions worldwide and more than two billion people online. This crowd of connected wills provides an historic opportunity to work as a single community for the public good. It is our responsibility to provide the right international framework to leverage their combined energy and enthusiasm.

ITU's message to COP17 is simple: ICTs are part of the solution, a solution that can move the agenda forward. It is time to recognise the phenomenal power of ICTs in the outcomes of the conference, and ensure that technology, innovation and information systems will be at the forefront of our strategy to address climate change. Recognition at this level will highlight ICTs as an enabler for climate change adaptation strategies, particularly in developing countries. By working together we can advance the implementation of new solutions for a better future.

Dr Hamadoun Touré has been Secretary-General of ITU since January 2007. Re-elected for a second four-year term in October 2010, Dr Touré is committed to ITU's mission of connecting the world, and to helping achieve the Millennium Development Goals and sustainable development through harnessing the unique potential of Information and Communication Technologies (ICTs).

The **International Telecommunication Union** (ITU) is the UN specialised agency responsible for ICTs. Its membership, comprising 193 governments, some 700 private companies and more than 20 universities, has called for ITU to take the lead in engaging the global community in addressing climate change through the use of ICTs. ITU is headquartered in Geneva, Switzerland, with 12 field offices around the world. Further information about ITU's climate change activities is available on the website.

International Telecommunication Union (ITU)
Place des Nations, 1211 Geneva 20, Switzerland
Tel: +41 22 730 5111 | Fax: +41 22 733 7256
Email: climate@itu.int | Web: www.itu.int/climate

MTN Group: creating stakeholder value through sustainability

At MTN, we ensure that sustainability is consistently integrated into our offerings, as well as how we deliver Information and Communications Technology (ICT) services.

Some of our markets are located in countries characterised as particularly vulnerable to the effects of climate change. The ICT sector is globally acknowledged, through publications such as the Global e-Sustainability Initiative's *Smart 2020*, as a key role player in addressing the impact of industries on the environment. For us, sustainability is about utilising our services and solutions to generate economic benefit for our stakeholders, while responsibly managing the impact of our business activities on the environment.

WALKING THE TALK: REDUCING OUR OPERATIONAL IMPACT

MTN's energy efficiency programme aims to ensure lower-carbon emissions and cost-efficient networks. We do this by deploying innovative engineering techniques, and investing in alternative and renewable energy sources. Alternative energy powers MTN networks in 15 of the 21 countries in which we operate, and all operations are focused on reducing their energy consumption.

HELPING SOCIETY MANAGE ITS WASTE

Electronic and electrical waste poses a global environmental and social health hazard. MTN's partnership with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is aimed at the full e-waste management stream from consumers to producers and recyclers. It will help reduce waste to landfill, and create 'green' jobs. A direct effect of increased e-waste recycling will be to relieve the environment, and increase reutilisation of valuable commodities. We aim to achieve this through partnering with small enterprises where possible.

PEOPLE AND THE ENVIRONMENT

MTN is using innovative connectivity solutions to reconnect families and improve enterprise development and trade. We have successfully launched products and services such as m-life, Google Trader and a free mobile service to facilitate the reconnection of refugees with their families, in conjunction with Ericsson and the United Nations High Commission for Refugees.

MTN is also focusing on SMART environmental solutions to improve energy efficiency for corporate and industrial customers. For example, MTN's smart fleet and logistics management solution directly reduce fuel and transport costs and carbon emissions, while our water usage solution enables businesses to monitor and manage their water usage.

CASE STUDY HIGHLIGHTS

South Africa: Our 2MW methane gas and combined heat and power (CHP) data centre in Johannesburg has saved over 17,500 tons carbon and equivalent (CO_2e) emissions annually, and has been approved as a UN Certified Emission Reduction carbon project. MTN's 22 wind, solar, hybrid and biogas network sites ensure further energy security, and operating cost and greenhouse gas reductions.

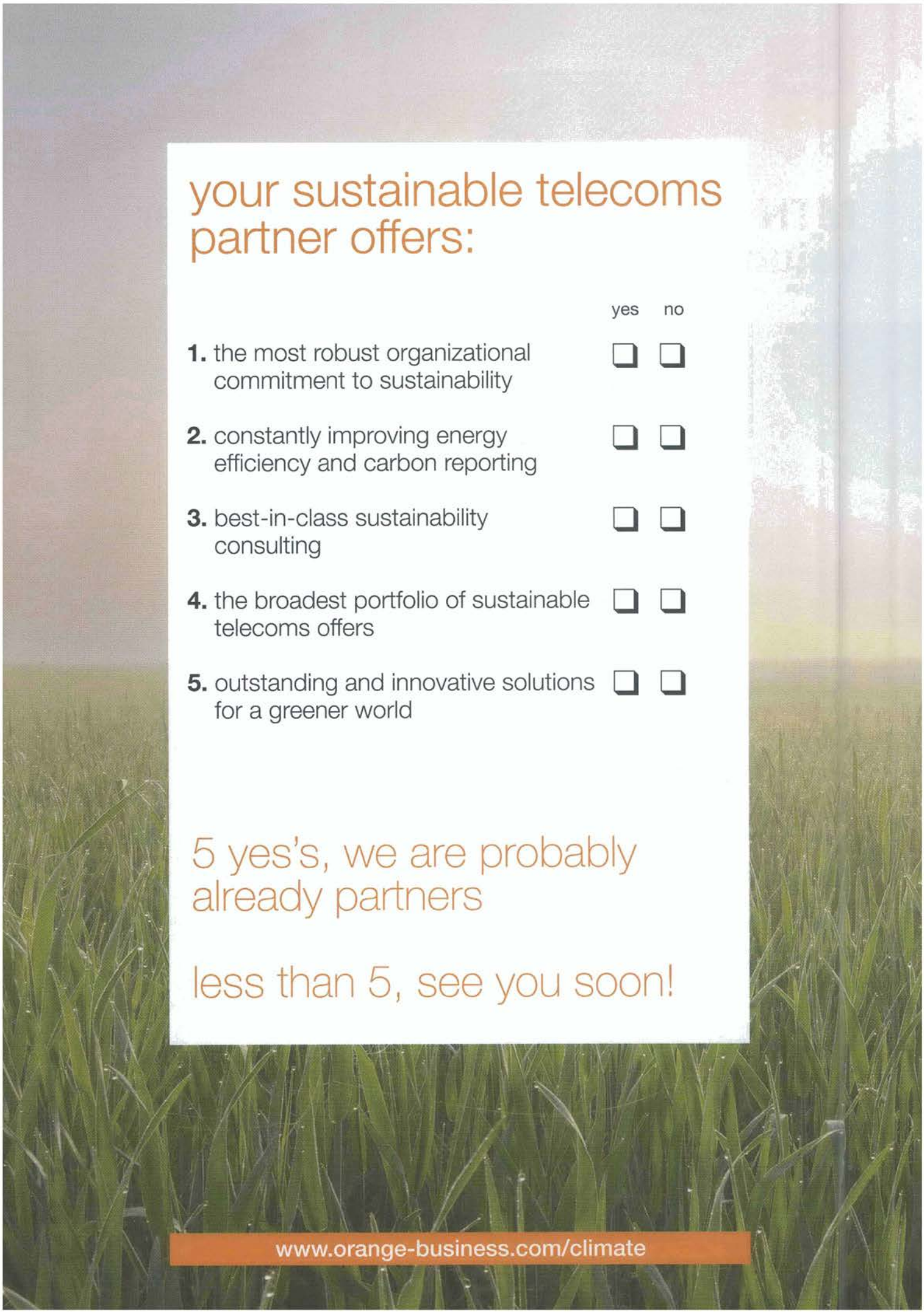
Cameroon: MTN's 40 solar sites will grow by another 10 in 2011, with 73 hybrid deep cycle battery sites also planned, to further reduce energy consumption.

Nigeria: We have installed solar-powered base stations in 179 villages, spread across 29 (of 36) states of Nigeria. Using smart technology, the base stations are equipped with a fully meshed satellite network technology, allowing for lower call costs.

Iran: MTN's energy efficiency programme uses a combination of solar, wind and hybrid battery-powered solutions for off-grid sites. A combination of smart power-save features such as free cooling, solar LED lighting and deep cycle battery solutions is used.

The **MTN Group**, launched in 1994, is a multinational telecommunications group, operating in 21 countries in Africa, Asia and the Middle East. As of June 30, 2011, MTN recorded 152.3 million subscribers.

Mobile Telephone Networks (Proprietary) Limited
216 14th Avenue Fairland, Roodepoort 2195
(Private Bag 9955, Cresta 2118), South Africa
Tel: +27 (0)11 912 3000 | Fax: +27 (0)11 912 3131
Email: sustainability@mtn.co.za | Web: www.mtn.com/sustainability


your sustainable telecoms partner offers:
yes no
1. the most robust organizational commitment to sustainability
2. constantly improving energy efficiency and carbon reporting
3. best-in-class sustainability consulting
4. the broadest portfolio of sustainable telecoms offers
5. outstanding and innovative solutions for a greener world
5 yes's, we are probably already partners
less than 5, see you soon!
www.orange-business.com/climate

Orange leads Europe's sustainable telecoms market

Verdantix, an independent analyst firm focused on sustainable business, identified Orange as the only Leader in Europe's sustainable telecoms market in the first study of its kind in 2009. Orange maintained its market leadership position in the 2010 and 2011 Verdantix studies.

"Orange stands out as one of a few telecoms operators that have been most successful in creating, marketing and delivering telecoms solutions which offer sustainability benefits to business customers," said David Metcalfe, Verdantix director and telecoms industry veteran.

Orange is proud of this leading position and commits to go on designing ICT solutions for a greener world.

commitment changes with Orange

today changes with orange™

Transformative ICT solutions: a paradigm shift in Durban

© iStockphoto

Climate change is not just a challenge, but an opportunity.

By **Luis Neves**, Chairman of the Global e-Sustainability Initiative (GeSI)

Tackling climate change is not only a huge challenge for the world – it is also a significant opportunity. The Information and Communication Technology (ICT) sector can make a huge contribution to low-carbon development through the deployment of innovative products and services which can provide the same or better service while reducing carbon emissions by 80 per cent or more. This tremendous opportunity needs to be better understood and supported by those who can make a difference. Only by applying transformative solutions across different business sectors can we hope to realise the proven potential for dramatic results in climate change mitigation and adaptation.

Transformative solutions have so far played only a marginal role in the global climate discussions, but this is about to change. In September 2011 Christiana Figueres, Executive Secretary of UNFCCC, stated: "The challenge we face calls for nothing less than a transformation of the world economy onto a green, sustainable pathway. Technology, both for adaptation and for mitigation, cannot but be at the very centre of this transformation."

As the world looks beyond incremental reductions in existing systems, the Global e-Sustainability Initiative (GeSI), in co-operation with the UNFCCC secretariat and a coalition of stakeholders, will introduce the award "Transformative Step of the Day" at COP17 in Durban. The award, which aims to shift focus to transformative solutions for climate change, will be announced on a daily basis during the second week of the negotiations (see box overleaf).

With this initiative GeSI will recognise solution providers as well as their enabling environments – namely governments – whose favourable attitudes have inspired transformative solutions. Further to this, the UNFCCC negotiations are an opportunity to support these efforts. By giving everyone a voice in the debate, GeSI strives to shift the focus from addressing problems to delivering solutions, and from incremental steps to transformative emission reductions.

ENABLING A LOW-CARBON ECONOMY

Twenty years ago the idea of high quality video conferencing was still science fiction, teleworking with a laptop a dream, and companies selling more e-books than paper books something that many thought would never happen. Today, modern high-speed communication networks, ubiquitous sensor technology and high computing power are a crucial enabler for almost all industries, essential for leading the way to a low-carbon economy. We are in a situation where connectivity and transformative ICT solutions can turn buildings into net producers of renewable energy and eliminate the need for physical products and activities.

Transformative ICT solutions are solutions that transform business models or allow countries to leapfrog past carbon emitting technologies. They often provide emissions reductions of 80 per cent or more from the status quo and they depend on an underlying energy-efficient infrastructure and connectivity.

The landmark report "SMART 2020: Enabling the Low-Carbon Economy in the Information Age" gave a clear picture of the key role that the ICT industry plays in addressing climate change globally and facilitating efficient and low-carbon development. While ICT's own sector emissions will nearly double by 2020, the strategic application and diffusion

© iStockphoto

Digital content and e-commerce allow for sizeable reductions in physical transport and support dematerialisation.

of ICT solutions in other business sectors can reduce total global emissions by as much as 15 per cent. These savings are five times larger than the total expected emissions from the entire ICT industry – and with more focus on transformative solutions this contribution could be significantly larger. Examples of sectors where transformative solutions can help reduce emissions by 80 per cent or more include:

- **Smart transport.** Radio tags can be attached to items in a cargo and their journey tracked from manufacturer to warehouse and to shop. This makes it easier to move goods and stock more efficiently. Using ICT could help cut carbon emissions from distribution and transportation by 1.52 billion tonnes. ICT can also facilitate decentralised and on-demand production that reduces the need for transport and storage to almost zero. In a similar way ICT can make commuting much more efficient while teleworking is even better and can support a much more resource efficient way of working.
- **Smart grids.** Connected electricity supply grids can be controlled so that energy is sent to industries and homes in the most efficient way, accelerating the uptake of renewable energy. By 2020, this could reduce carbon emissions by two billion tonnes. Smart grids can also support decentralised renewable energy distribution and the accelerated uptake of electric cars.
- **Smart buildings.** By using ICT in buildings for managing light and heat systems, resource consumption can be adapted to match demand in real time. Smart buildings could save 1.7 billion tonnes of emissions. ICT can also help a shift in approach where connected buildings in cities become net producers of renewable energy.

SHIFTING FOCUS TO SOLUTION PROVIDERS

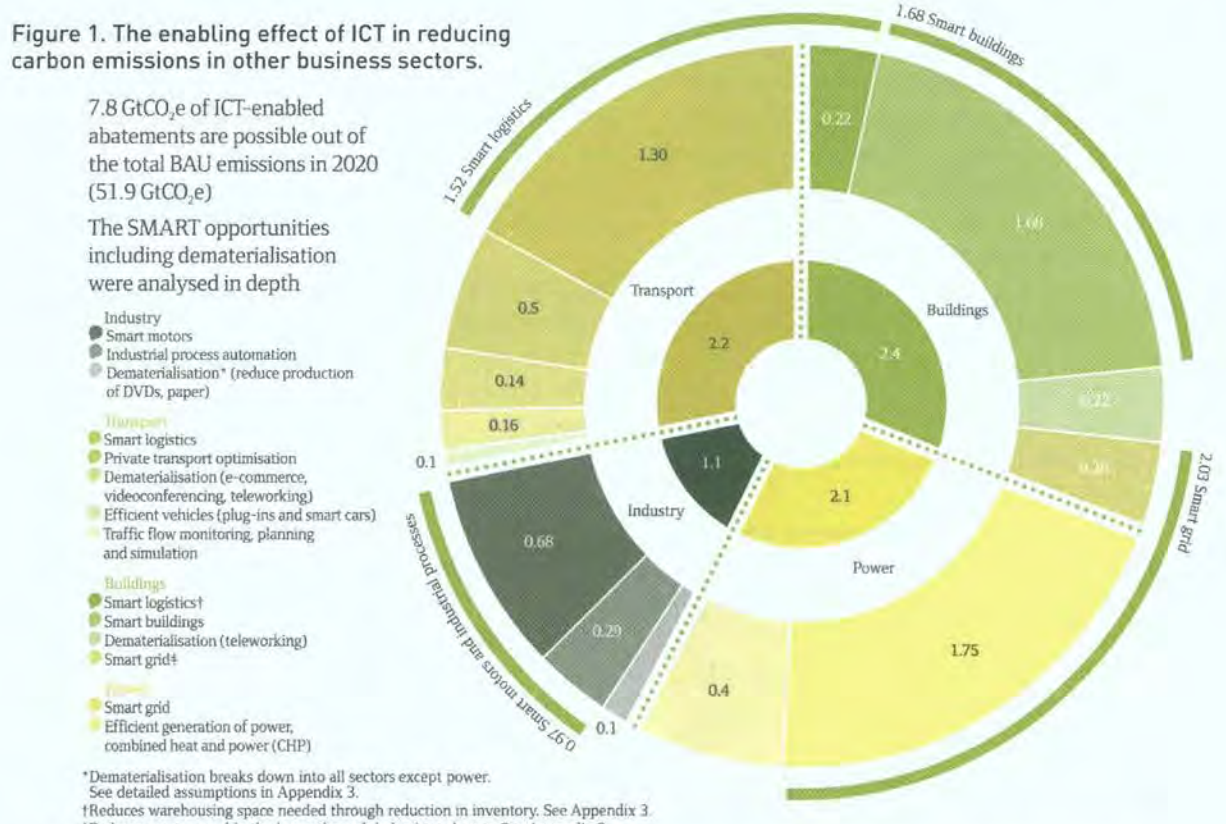
It is now widely recognised that incremental solutions, those that marginally reduce emissions within current systems, are important but far from sufficient. Still many forums developing climate activities predominantly focus on the high emitting sectors. Industry, including the ICT sector, is often viewed as a polluter as opposed to a solution provider. It seems that companies as solution providers are not yet fully heard, understood or supported by those who can make a difference.

Incremental steps forward will not be enough to deliver the results that are needed. It is imperative that we look for an approach based on collaboration, innovation, equity and what the planet needs. Instead of looking for ways to avoid commitments it is time to create new clusters of stakeholders delivering transformative solutions for climate change. Work must begin in the key opportunity areas – transport, buildings, energy and dematerialisation – to help turn potential carbon reductions into reality. Transformative solutions can be so resource efficient that nine billion people can use them without destroying the planet. We now need to move from potential to implementation and dramatically reduce the time it takes innovative ideas to hit the market.

BE THE CHANGE YOU WANT TO SEE IN THE WORLD

For a long time the focus in climate discussions has been on incremental improvements and on the measures to be taken by major polluters. This is important and should continue to be an important aspect of the dialogue. However, it is also time to

Figure 1. The enabling effect of ICT in reducing carbon emissions in other business sectors.



*Dematerialisation breaks down into all sectors except power. See detailed assumptions in Appendix 3.
†Reduces warehousing space needed through reduction in inventory. See Appendix 3.
‡Reduces energy used in the home through behaviour change. See Appendix 3.

Source: "SMART 2020 – Enabling the Low-carbon Economy in the Information Age", a report by GeSI and the Climate Group.

TRANSFORMATIVE STEP OF THE DAY

The Global e-Sustainability Initiative (GeSI) in cooperation with the UNFCCC secretariat and a coalition of stakeholders will introduce the award "Transformative Step of the Day" at COP17 in Durban. The award will be a way to increase focus on transformative ICT solutions during the second week of the climate negotiations.

Transformative ICT solutions are solutions that transform business models or allow countries to leapfrog past carbon-emitting technologies. They often provide emission reductions of 80 per cent or more than the status quo and depend on an underlying energy-efficient broadband infrastructure. One example would be remote collaboration and virtual meetings, which significantly reduce carbon emissions caused by travel.

"Transformative Step of the Day" will be launched on 5 December 2011, at the beginning of a series of daily events in Durban, which will raise visibility and generate discussion on the value of transformative ICT solutions. The award will be facilitated by a web platform and a mobile application (www.transformative-step.net) to allow governments, solution providers and the public at large to nominate, vote and comment on the initiative or project that they think deserves to be the "Transformative Step of the Day". With this initiative GeSI will recognise solution providers as well as their enabling environments and bring greater stakeholder engagement, transparency and inclusiveness to the climate discussions.

"Transformative Step of the Day" and its supporting web-platform and mobile application will be launched thanks to the generous support of GeSI members Deutsche Telekom and Ericsson.

Become involved at **www.transformative-step.net**

ensure that a new generation of solution providers becomes an integrated part of all important initiatives and policies focusing on climate change mitigation and adaptation. Durban could be a historic turning point where solution providers for the first time become an integral part of the discussions. As almost all transformative solutions depend on ICT, GeSI is well placed to play an active and co-ordinating role by not just involving obvious solution stakeholders such as renewable energy providers, but also everyone from designers and architects with new low-carbon city solutions to grass roots groups promoting sustainable lifestyles through social networks. It is not enough to have low-carbon ICT solutions with great potential; policy-makers must be aware of these solutions and support their accelerated uptake. Those policy-makers who are aware and have put forward solutions in different ways during the negotiations deserve to be recognised.

Mahatma Gandhi once said, "Be the change you want to see in the world." We encourage you to participate in "Transformative Step of the Day" whatever your country and location. The initial support of solution providers is expected to generate further momentum. Those who can take this thought leadership forward are likely to be rewarded by positioning solution providers to contribute to climate change.

Global connectivity allows almost anyone living on this planet to participate and contribute to the global climate negotiations. About 20 years ago the first web page was created and smart phones were a distant idea. Let's mark this anniversary in Durban by making it the first series of globally connected negotiations ever with a key focus on transformative solutions for the 21st century.

The ICT sector has both a profitable opportunity and a critical role to play with other sectors in designing and deploying solutions needed to create a low-carbon society.

> **"It is time to ensure that a new generation of solution providers becomes an integrated part of all important initiatives and policies to tackle climate change."**

Ultimately we are striving to achieve a paradigm shift in the climate change debate from reducing problems to delivering solutions, from incremental improvements in existing systems to transformative solutions that deliver services in new ways, and from big polluters to a new generation of solution providers.

Luis Neves is Chairman of the Global e-Sustainability Initiative (GeSI). He also holds the position of Vice President of Corporate Responsibility at Deutsche Telekom. With more than 30 years of experience at the national and international level in the field of telecommunications and Information Society, Luis was the driving force and chairman of the steering committee of the landmark study "SMART 2020 – Enabling the Low Carbon Economy in the Information Age." He currently holds positions and participates in a range of international projects and initiatives, including GeSI, the United Nations Global Compact LEAD, and Steering Committee of the United Nations Caring for Climate Initiative.

The **Global e-Sustainability Initiative** (GeSI) is a strategic partnership of the Information and Communication Technology (ICT) sector and organisations committed to creating and promoting technologies and practices that foster economic, environmental and social sustainability. Formed in 2001, GeSI's vision is a sustainable world through responsible, ICT-enabled transformation. GeSI has 33 members representing leading companies and associations from the ICT sector, and also partners with two UN organisations – the United Nations Environment Programme (UNEP) and the International Telecommunications Union (ITU) – as well as a range of international stakeholders committed to ICT sustainability objectives.

Alice Valvodova, Executive Director
Global e-Sustainability Initiative (GeSI)
c/o Scotland House, Rond Point Schuman 6, B-1040 Brussels, Belgium
Tel: +32 2 282 8442 | Fax: +32 2 282 8414
Email: alice.valvodova@gesi.org | Web: www.gesi.org

Environmental certification programmes like EPEAT can help to make electronic products sustainable.

Supplier environmental certification and rating: the EPEAT experience

By **Sarah O'Brien**, EPEAT Outreach Director and **Jeff Omelchuck**, Director and EPEAT Executive Director of the Green Electronics Council (GEC)

Organisations undertaking sustainability initiatives are often challenged to prioritise environmental projects in competition with those considered more central. In today's economic climate, even the most environmentally dedicated manager may think twice before allocating staff and funding resources to what could be misconstrued as simply a 'feel-good' programme. Using environmental tools to address identified issues with core business activities can overturn the too-common perception that business value must be sacrificed for environmental benefit. If an environmentally positive strategy can improve operational efficiency, reduce cost overruns, minimise regulatory compliance costs, or mitigate occupational safety issues and absenteeism, the fact that it also helps the environment will be a welcome additional feature, rather than cause for concern.

Most organisations can effectively leverage existing purchasing activities for environmental benefit. Whatever the economic climate, organisations must continue to purchase goods and services to operate. Many governments spend nearly half their budget on purchasing, and in many emerging markets government procurement constitutes a very large segment of GDP – for example, 46 per cent in Brazil, 52 per cent in Ghana, and 43 per cent in India. In governments like these and in large global enterprises, procurement management can be an essential tool to create operational efficiencies and environmental benefit.

To give a very simple example of this dual benefit: requiring vendors to take back and document recycling or reuse of packaging can help large facilities reduce the complexity and cost of handling and storing enormous volumes of packing waste, and eliminate the cost of recycling or disposing of that waste in the end. Compelling suppliers to deal with waste may also push efficiencies back up the supply chain and encourage adoption of minimal, recyclable or re-usable packaging, with a broad environmental benefit.

> **“Procurement management can be an essential tool to create operational efficiencies and environmental benefit.”**

However, asking procurement staff to identify environmentally preferable product and service options does not necessarily serve the purpose of increasing organisational efficiencies. Without significant amounts of training

and research, purchasers have little ability to evaluate differing environmental claims, or to assess whether price differentials, if any, are justified by direct organisational benefit as well as environmental gains. Instead they may take vendors' 'green' claims at face value, and end by spending more money for questionable added value, either to the organisation or to the environment.

CERTIFICATION AND RATING

This is where the role of environmental certification and rating systems becomes essential. Such protocols, when developed with stakeholder participation, sensitivity to national and regional differences, and openness to broad participation, can offer an effective means to first define and then centralise and streamline demand for greener products.

Environmental ratings can offer a more effective way to alter vendor behaviour and product and service design than development of individual contract specifications, even where the purchaser is very large. Individual purchasers' green requirements do not constitute a trend a supplier can reliably follow to reap market rewards. Thus while they may effectively address internal impacts, they may not have a broader impact on vendors' practices. But aggregating the demand of thousands of purchasers through a central, broadly used rating system or certification creates a market incentive for development of environmentally preferable options and supports economies of scale that reduce the potential cost of that environmental benefit.

> **"In this online one-stop shop purchasers can easily identify products that can help reduce their energy consumption."**

The EPEAT environmental rating system for electronic products (www.epeat.net), managed by the non-profit Green Electronics Council, provides a very promising example of such a tool's potential. Though it is by no means flawless, it has developed on a basis and with a level of success that set it apart from standard certification bodies, and the EPEAT model can offer some perspective on innovative practice in the area of environmental rating and certification.

USING EPEAT

EPEAT offers a broad portfolio of qualified personal computer products – desktops, laptops, integrated systems, displays, workstations, and thin client devices – that meet a wide array of 51 environmental performance criteria, to help significantly reduce the lifecycle environmental impact of IT operations.

Products are rated based on 23 required and 28 optional criteria – Bronze (for products that meet only the required criteria), Silver (products meeting required plus 50 per cent of the optional criteria) and Gold (required plus 75 per cent or more optional). Purchasers have the option to set the ratings bar at any level in their contract specifications.

By establishing a uniform 'measuring stick' for electronic products, and a central registry where products' comparative performance can be assessed head to head, EPEAT offers purchasers a way to evaluate products' comparative lifecycle environmental impacts. In this online one-stop shop purchasers can easily identify products that can help reduce their energy consumption, eliminate toxic materials from their products and thus from their waste stream, increase use of recycled content and ease of recycling, and enable them to use manufacturer take-back and recycling at end of life to responsibly dispose of products. Consistent with other certifications, the system also provides manufacturers with uniform guidance for developing environmentally preferable products that will meet market demand.

CRITERIA FOR SUCCESSFUL RATINGS

Beyond EPEAT's efficacy as a tool to connect purchasers with environmentally preferable products, the system may more broadly offer a useful model for improving the scalability and effectiveness of environmental rating tools – with lessons learned that can be applied cross-sectorally to enable more effective and large-scale incentives for product and service redesign through purchasing instruments.

Stakeholder development. Green purchasing criteria must accommodate the latest scientific insights into products' or services' environmental impact, and also seek to move issues forward in the face of uncertainty. Because understanding of environmental impact is always increasing, it is important to understand purchasing as a cyclical process, which can incorporate additional criteria as knowledge and technical capacity increase. A successful environmental purchasing protocol must conform with or accommodate scientific insights, but also:

- Not unduly restrict products or suppliers;
- Not require extensive research and evaluation by purchasing staff whose expertise lies elsewhere;
- Build on practical insights of stakeholders regarding capacity to meet requirements;
- Harmonise with other standards as much as possible to reduce duplication of effort.

Standards can serve as the bridge between purchasers' needs and available technologies, approaches and strategies, enabling consistency of approach, and aggregating purchasing power to move markets. By reducing the complexity of the purchasing process, they can enable more actors to buy environmentally preferable goods and services.

Stakeholder consensus standards bring multiple kinds of knowledge to the table: pure science, engineering knowledge, environmental health insights, process change experience, purchasing experience, and IT user needs. By enabling debate and discussion around where to 'set the needle' on what constitutes environmental leadership, they can allow knowledge that is most advanced or most applicable to be used for developing and assessing different criteria, providing

a reality check for all parties. Stakeholder processes can be contentious, and open standards development takes much longer than a development process ruled by a small group of experts. But, where successful, a stakeholder consensus process can ensure wide support and broad participation.

Tiered ratings. Establishing a tiered rating system that awards credit at a baseline for leadership, then rewards higher performance with additional recognition, achieves several crucial goals – it creates competitive pressure for producers to score higher than rivals, yet maintains flexibility for manufacturers to innovate and select their own path to higher ratings. It also supports the participation of smaller manufacturers in the system – significantly improving the environmental performance of their products compared with conventional products, even if they can only qualify for the entry level ranking. This is a crucial point if we want green procurement to promote green development and innovation on the part of the small and medium enterprises (SMEs) that make up the bulk of the emerging economies. And finally – tiered ratings with optional criteria enable inclusion of forward-looking requirements that promise reward for attributes that may not be attainable by any manufacturer at the time the standard goes into effect, further encouraging environmental innovation.

Variable, comprehensive fees. Tiered ratings give room for smaller regional manufacturers to participate in the system; so does a fee structure based on size or revenues of participating companies. Further, fees that are not charged on a per product basis but assessed on an annual or other general basis can help encourage the registration of as many qualified products as possible. EPEAT has encountered significant financial constraints due to its annual, sliding scale fee structure, but nearly half the participating manufacturers are smaller regional companies. It is vitally important that green ratings systems should not privilege only sophisticated global producers, but also offer incentive to smaller manufacturers by enabling them to win recognition for their environmental design initiatives, and that their fiscal structure should encourage proliferation of environmentally friendly purchasing choices rather than making addition of products economically unfeasible.

Centralised product registry. Providing a central, online, publicly accessible product registry enables purchasers and the general public to compare product and manufacturer performance head to head – by simply identifying products available at a given rating tier, or drilling down to highly detailed reporting on the specific optional criteria each product meets. It moves the rating system from a closed list which only identifies whether a product is in or out of the system, to a dynamic interface between consumers and producers. This transparency in turn spurs manufacturers to compete to meet higher numbers of criteria and qualify products at higher levels, since their record is visible to anyone who visits the registry. This competition to meet additional criteria pushes innovation and environmental excellence forward.

Integration into commerce. Delivering ratings information to the point of purchase wherever possible is essential if environmental ratings are to have a real impact on the vast majority of businesses and consumers who buy through a reseller or retailer. Ratings information needs to be integrated into e-commerce websites, distributor databases and OEM web portals as a natural part of the purchasing process rather than a separate research activity. This reduction of barriers enables purchasers and end users to integrate environmental ratings into purchasing decisions without add-on research.

The development of environmental ratings systems and certifications that meet the outlined framework challenges those of us in the green procurement world to expand our vision – to exert ourselves in new arenas. It is not enough in today's world to develop criteria based on the opinions of a small group of experts; it is outdated in today's world of e-commerce and e-communications to simply grant a seal of approval and wait for a customer to research it. We need to work with new techniques of e-commerce, lateral communication through social media and web search, and even partner with manufacturers, resellers and retailers to engage in direct and indirect marketing campaigns, to integrate our certifications into the world where money flows to products and services. And by doing so we can provide a business case and value for manufacturers who see demonstrated impact on their bottom line from environmentally rated products.

Sarah O'Brien is EPEAT Outreach Director. She was a member of the original stakeholder development team which created the EPEAT criteria, participating in the process as an expert on environmentally sustainable purchasing. Her previous position was Environmentally Preferable Purchasing Program Manager for H2E/Hospitals for a Healthy Environment.

Jeff Omelchuck founded the Green Electronics Council (GEC) in 2005 with the vision of re-inventing society's relationship with electronics. Jeff is now the Executive Director of the GEC and of EPEAT. Jeff began his career as an engineer in the electronics industry in Silicon Valley, then founded and managed a consulting and training practice before starting GEC.

The **Green Electronics Council** (GEC) was founded in 2005 to bring focus to the special issues of electronics and sustainability, and to find constructive paths forward. Soon after GEC's founding we were selected by stakeholders to manage EPEAT, the green electronics certification and purchasing system that has created a US$60 billion market incentive for greener laptops, desktops, and monitors. GEC is a programme of the International Sustainable Development Foundation, a charitable non-profit organisation.

Green Electronics Council
227 SW Pine Street, Suite 220, Portland, OR 97204, USA
Tel: +1 503 279 9383 | Email: info@greenelectronicscouncil.org
Web: www.greenelectronicscouncil.org
www.epeat.net

Barloworld Logistics

Barloworld Logistics innovates in the green supply chain

The 21st century is becoming more and more concerned with the sustainability of the planet's energy resources, and the reduction of environmental damage caused by human means. Pressure is mounting on nations and big business to aid in the reduction of carbon emissions. One of the clearest and most urgent areas for change is in global supply chains, underpinned as they are by one of the major sources of carbon emissions, commercial transport. Leading South African supply chain management company Barloworld Logistics has engaged in several key sustainability initiatives, which bring together lean process thinking with an eye on the bottom line and competitive advantage, with a commitment to innovation and environmental sustainability.

TACKLING TRANSPORT EMISSIONS

One of the most practical and effective interventions the company has accomplished recently is the development of a 'Green Trailer' – an interlink taut liner trailer combination which achieves significant reductions in the amount of fuel it uses through aerodynamic and other modifications.

Transport is the biggest area in logistics that affects the environment directly, but is one of the easiest components to address strategically. Within the South African context, transport is responsible for about 13 per cent of South Africa's total greenhouse gas emissions. The Green Trailer project therefore focuses on sustainability and profitability as two sides of the same coin, and so strives towards operational excellence.

All changes that were made to the Green Trailer are within the bounds of current legislation. Field research on the initiative was conducted on the N3 between Johannesburg and Durban. The vehicles on this route do a round trip of 1,160 km on a dedicated route every 24 hours, and 98 per cent of the route is on the N3 and N2. This means that the vehicles maintain a much more constant speed compared with vehicles operating on secondary roads or in urban areas. This also means that the effects of wind resistance are higher than on any other route. The expected reduction in fuel consumption on the Green Trailer Project was between six and eight per cent, but the actual benefits far outweighed expectations. The rig travelled 100,000km in the six month test period, and saved 10.6 per cent in fuel when compared with the rest of the fleet running the same route, under the same weather conditions and with the same payload. This equates to an actual cost saving of R8,500 (US$1,030) per month just on fuel, and just on one rig. The total wind drag reduction from the Green Trailer conversion also exceeded expectations, coming in up to 43 per cent.

The other major benefit attendant on the significant reduction in fuel use is, of course, carbon emission reduction. The 10.6 per cent fuel saving amounted to a massive reduction of 13.77 tons of CO_2 emissions during the test period.

The Green Trailer Project.

STANDARDS OF EXCELLENCE

Barloworld Logistics is also heavily involved in the implementation of best practice benchmarks for the road freight industry. The focus on environmental awareness in the road transport industry is in danger of becoming equated with carbon emission reduction targets in most business people's minds. It is well known that South Africa's road transport system is heavily overloaded, and carries too much traffic that cannot be accommodated by rail freight. This leads to over-use of the road infrastructure and damage to roads, as well as the dangerous consequences of too much heavy freight traffic on our roads, such as accidents and overloading. All these factors need to be addressed, in addition to carbon emissions, if the industry is to continue to be sustainable. The key point about 'greening' a road transport fleet is not only to reduce emissions, but to make the fleet safer, more efficient and less costly – all factors which make the business more sustainable as well as more environmentally friendly.

The ongoing efforts to change the freight mix in South Africa away from road transport to other modes will take a long time to become effective. In the meantime, efforts to make the road transport industry more sustainable continue. Despite concerted and ongoing efforts for an effective law enforcement strategy by the road and traffic authorities, the sharp increase in heavy vehicle traffic and the effects of overloading continue to be a major problem on South African roads. Overloading causes premature road deterioration and, together with inadequate vehicle maintenance, high levels of driver fatigue and poor driver healthcare programmes, contributes significantly to South Africa's poor road safety record.

In response to these dangers, the industry has devised and implemented the Road Transport Management System (RTMS). This is a self-regulation initiative that has already shown outstanding results since its implementation, and supports the Department of Transport's National Overload Control Strategy (NOCS).

RTMS is an industry-led, government-supported, voluntary, self-regulation scheme that encourages consignees, consignors and road transport operators to implement a management system (a set of standards) that demonstrates compliance with the Road Traffic Regulations and contributes to preserving road infrastructure, improving road safety and increasing productivity. Barloworld Logistics has been an enthusiastic supporter and early adopter of the standard.

BRINGING SUPPLIERS INTO THE GREEN FOLD

The company has also been concerned to develop wider supply chain management programmes which fit into a holistic environmentally sustainable business strategy. One of these is the launch of a revolutionary accreditation and benchmarking programme for transport suppliers to large businesses, in a concrete and practical effort to positively address South Africa's energy-intensive and carbon-rich sustainability profile. The Green World initiative provides businesses with a hands-on resource to assist them in reducing their carbon footprint through helping their transport suppliers become more energy-efficient and environmentally aware.

Responsibility for sustainability now has to be seen more holistically, in the context of the wider business network. A perfect example of this is the relationship between businesses and the transporters who supply them with services in moving their products to where they need to be, but in the process impact, sometimes negatively, on the environment. The business imperative for a supplier accreditation programme in the sustainability space is therefore more important now than ever, which is exactly the type of accreditation and benchmarking that Barloworld Logistics' Green World programme proposes to provide.

PLANNING FOR REAL CHANGE

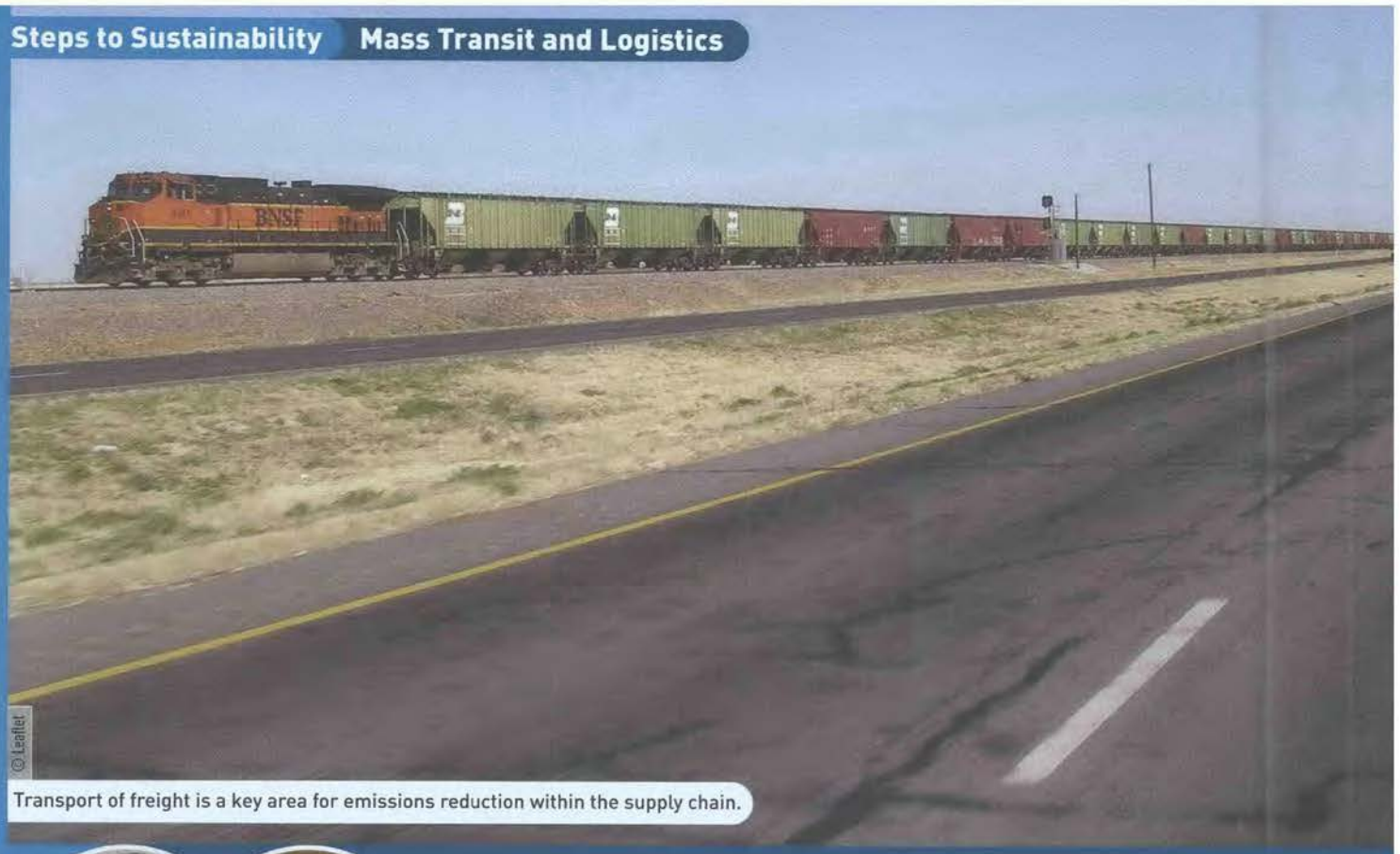
Finally, the business has also been successfully implementing greener supply chain planning for its clients through the use of a bespoke software tool, CAST-CO_2, w
hich calculates the carbon footprint of any supply chain and provides its optimal configuration, based on cost, service levels and carbon emissions. This crucial planning tool incorporates all modes of transport as well as types of warehouse operations, and the likely future costs of carbon, thereby providing a comprehensive and environmentally responsible strategic planning picture.

> **"Responsibility for sustainability now has to be seen more holistically, in the context of the wider business network."**

Supply chains offer the biggest risk and opportunity for clients when it comes to environmental and business sustainability issues. Barloworld Logistics has existing strategies and support to underpin its vision to become market leader in the sustainable supply chain space, offering real business opportunities and competitive advantage for clients and the company.

Barloworld Logistics is South Africa's leading integrated logistics and supply chain management company, and a fast-growing global player. Over 70 per cent of potential savings and service enhancements in a supply chain come from the re-engineering and integration of logistics processes. The company creates strategic advantage for its clients by optimising and integrating the client's logistics processes and information flows, thereby radically reducing costs and increasing service levels.

Kate Stubbs, Marketing Executive
Email: kstubbs@bwlog.com
Web: www.barloworld-logistics.com



© Leaflet

Transport of freight is a key area for emissions reduction within the supply chain.

The challenge to green transport

By **Niels Beuck**, Policy Advisor and **Marco Leonardo Sorgetti**, Director General of the European Association for Forwarding, Transport, Logistic and Customs Services (CLECAT), Brussels

In a recent study by the German Environmental Agency it was stated that the earth needs one million years to produce as much fossil fuel as mankind currently uses in one year. This statement, which tries to visualise the huge amount of fossil energy that is being consumed by our society, illustrates the following important questions: can we find alternatives to avoid the total depletion of our reserves before it is too late and, in our domain, can transport find alternatives to power trucks, aircraft and ships? Even those working in the fossil fuels industry believe today that alternatives should be found soon.

The upcoming scarcity of fossil fuels is well documented – among others, in Paul Roberts, *The End of Oil: On the Edge of a Perilous New World*. The discovery of new oilfields is becoming both more difficult and less rewarding in terms of quantity and quality. These are facts that demand a real change. However the environmental performance of fossil fuels has been targeted by restrictive measures in recent years, both through market-based instruments such as the emissions trading schemes and through stark prohibitions, like Low Emission Zones, where general traffic is not allowed. If nothing is done, greenhouse gas emissions from transport are estimated to rise by 130 per cent in the period between 2000 and 2050. The upcoming discussions in Durban are an opportunity to reach a global solution for a global problem; legislative initiatives may be studied at international level by organisations such as the International Maritime Organization (IMO), the World Trade Organization (WTO) and others.

> **“The upcoming discussions in Durban are an opportunity to reach a global solution for a global problem.”**

Freight forwarders work within the supply chain in order to facilitate the transport, storage, clearance and delivery of the goods. They use all modes of transport and in so doing have to comply with the various rules and regulations that are decreed by these forums. At the same time forwarders must convince their customers, who demand reliability, speed, timing and low costs – not an easy combination.

Defining best practices is one of the most productive options to balance these two competing interests, and this method has been widely followed in our sector. This is, however, a long and winding road, and there are still many things that can be improved. At CLECAT's last Freight Forwarders' Conference (2010), Fiege Stiftung & Co KG gave a presentation about the company's experiences in greener and more efficient logistics, pointing out that best practices and sustainable transport contribute to an "added value for customers as well as for the environment". That being said, logistics is not only transport: a more wide-range view on what can be done to improve the environmental performance of logistics can contribute to our industry's footprint. This is an area where legislation is finding it increasingly difficult to step in without interfering with economic development.

WHAT ARE BEST PRACTICES?

There is an abundance of best practice examples, provided by many companies that have found ways to improve their business models by adopting environmentally sensitive solutions. CLECAT collected these in the first edition of its *Logistics Best Practice Guide* in 2009. The guidebook bundles over 100 best practices from the transport industry, collected from CLECAT members, the International Road Transport Union (IRU), the European Intermodal Association (EIA), the Institute of Grocery Distribution (IGD) and others.

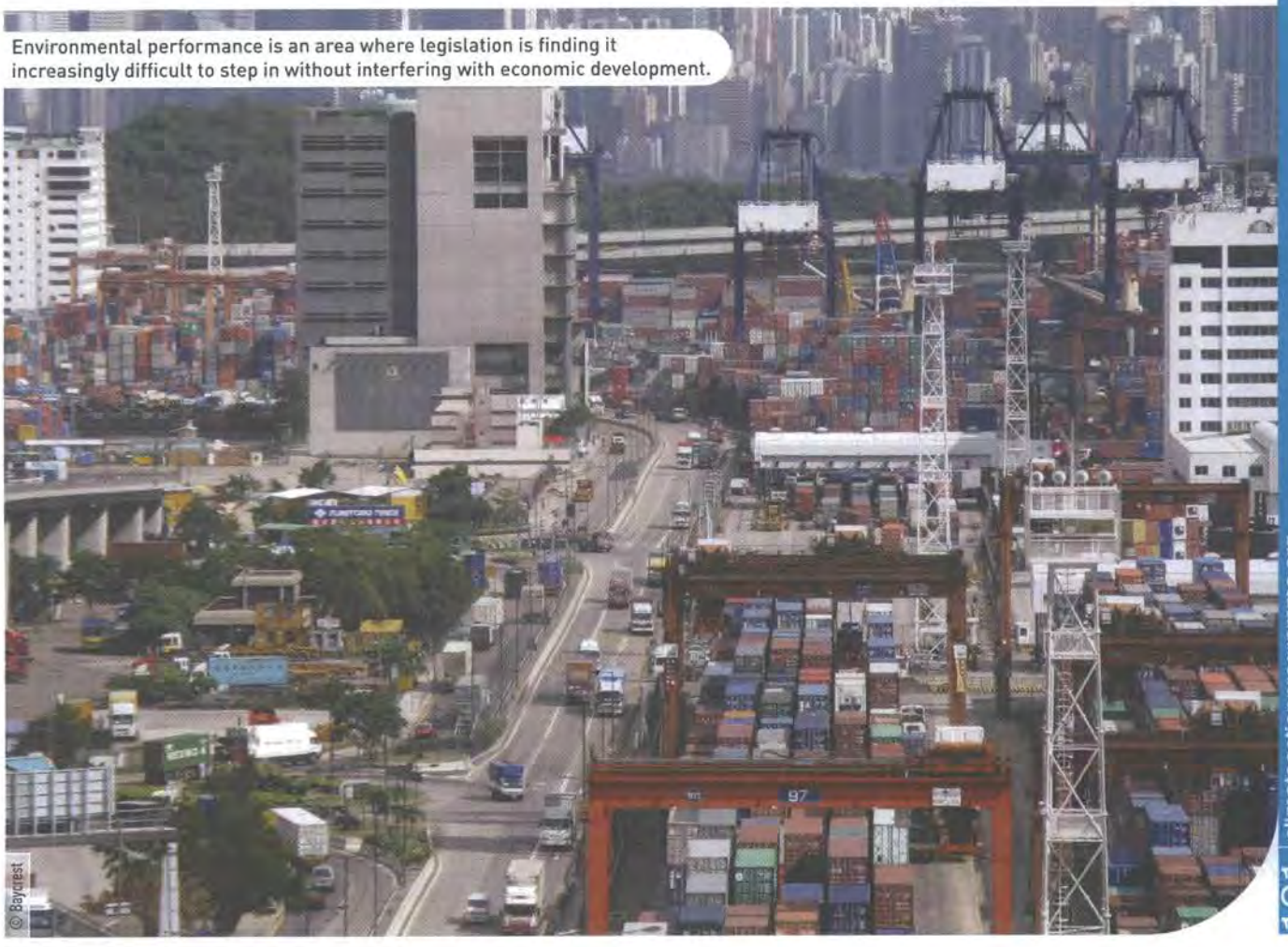
A quick analysis of these examples suggests that a company should define for itself what it perceives to be 'green'. As soon as it is clear what one wants to achieve, it is possible to research and apply specific best practices, which best suit the company's business model. For example, transport-related benefits will always be indirect, if the company does not have its own fleet. Such ex-ante evaluations are a critical first step to take informed and intelligent decisions.

FREIGHT FORWARDERS AND THE ENVIRONMENT: MONEY SAVED

The sector represents a business that is geared to providing tailor-made logistics solutions for customers. It is only natural that logistics service providers have accompanied their customers in their growing awareness of environmental issues in these years. Today many customers require the environmental performance index of the service provided to be included in the tender.

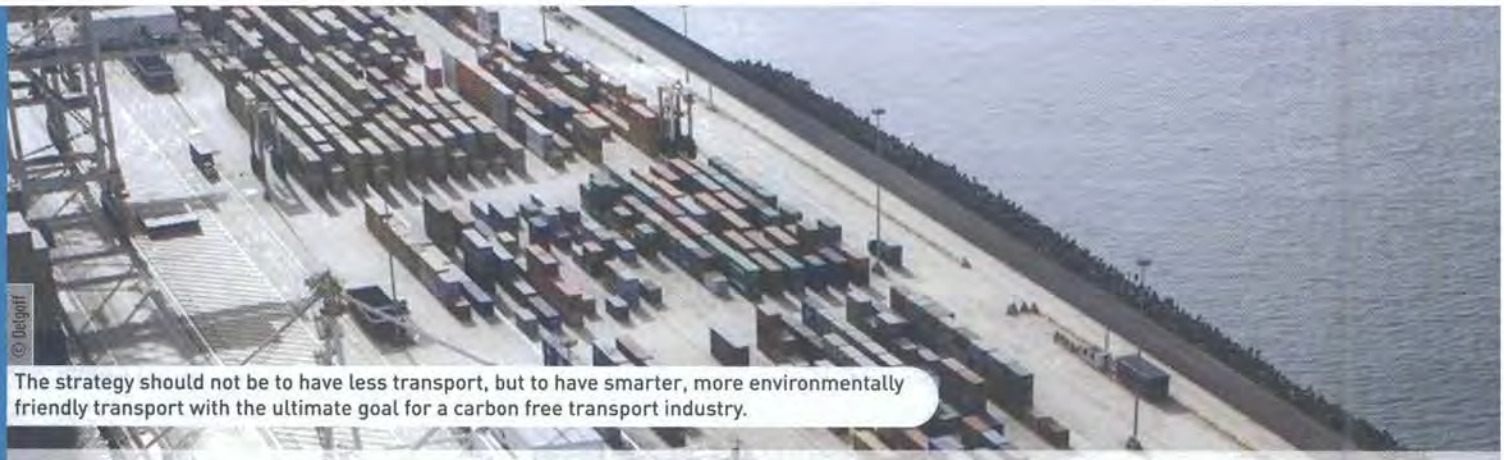
> **"A company should define for itself what it perceives to be 'green'."**

The reasons for traders to introduce sustainable logistics are manifold. These companies may have a sustainability programme in place for ethical reasons or simply hope to



Environmental performance is an area where legislation is finding it increasingly difficult to step in without interfering with economic development.

© Baycrest



The strategy should not be to have less transport, but to have smarter, more environmentally friendly transport with the ultimate goal for a carbon free transport industry.

improve their public image, but it is not only the customer/shipper who can benefit from 'green logistics'. There are also distinct advantages for freight forwarding companies to engage in sustainability practices. Energy savings, for example, will automatically translate into cost savings. Better route planning, optimised load factors and reduction of empty runs are other examples for more environmentally friendly transport that at the same time contribute to optimising logistic processes, in the end producing important savings.

In CLECAT's *Logistics Best Practice Guide* we have distinguished three different kinds of best practices: those with a focus on technology, on personnel and on management. While the technology chapter makes it necessary to make somewhat larger investments, changes in dealing with staff or the management process might come relatively cheap. In the space of this article it is impossible to make an analysis of the results of these methods: we must urge you to read the document, which is published on our website.

SPECIAL CASE – HORIZONTAL COLLABORATION

Horizontal collaboration is a rather hot topic today, especially in shippers' forums. Enhanced horizontal collaboration between logistics service providers, i.e. collaboration between competitors, has some potential for reducing the number of transport movements and optimising warehouse use, but there are competition issues that the regulator seems inclined to severely sanction.

> **"Changes in dealing with staff or the management process might come relatively cheap."**

In other words, curbing emissions and prohibiting collusion show a conflicting interest between different regulators that we need to fully understand and discuss with the institutions.

HOW CAN WE HELP THE SECTOR?

We can say that we have likely identified the problems that need to be resolved. However, we are not convinced that we already know the solutions. Logistics should be supported by the necessary transport infrastructure, comprising both the 'hardware' (e.g. TEN-T) and the 'software' (e.g. ITS, Internet of Things, alternative fuels, etc). In promoting innovation, picking winners at an early stage may backfire by restricting the scope of the exercise; all promising technologies should be supported at the beginning, perhaps by offering tax reliefs. The transport industry, logistics operators, freight forwarders and their shipper customers will choose the technology that is most likely to give added value together with environmental advantages. There is no benefit in obstinately promoting concepts that have been part of the discussion of greening the transport sector, but have failed to procure any practical advantage.

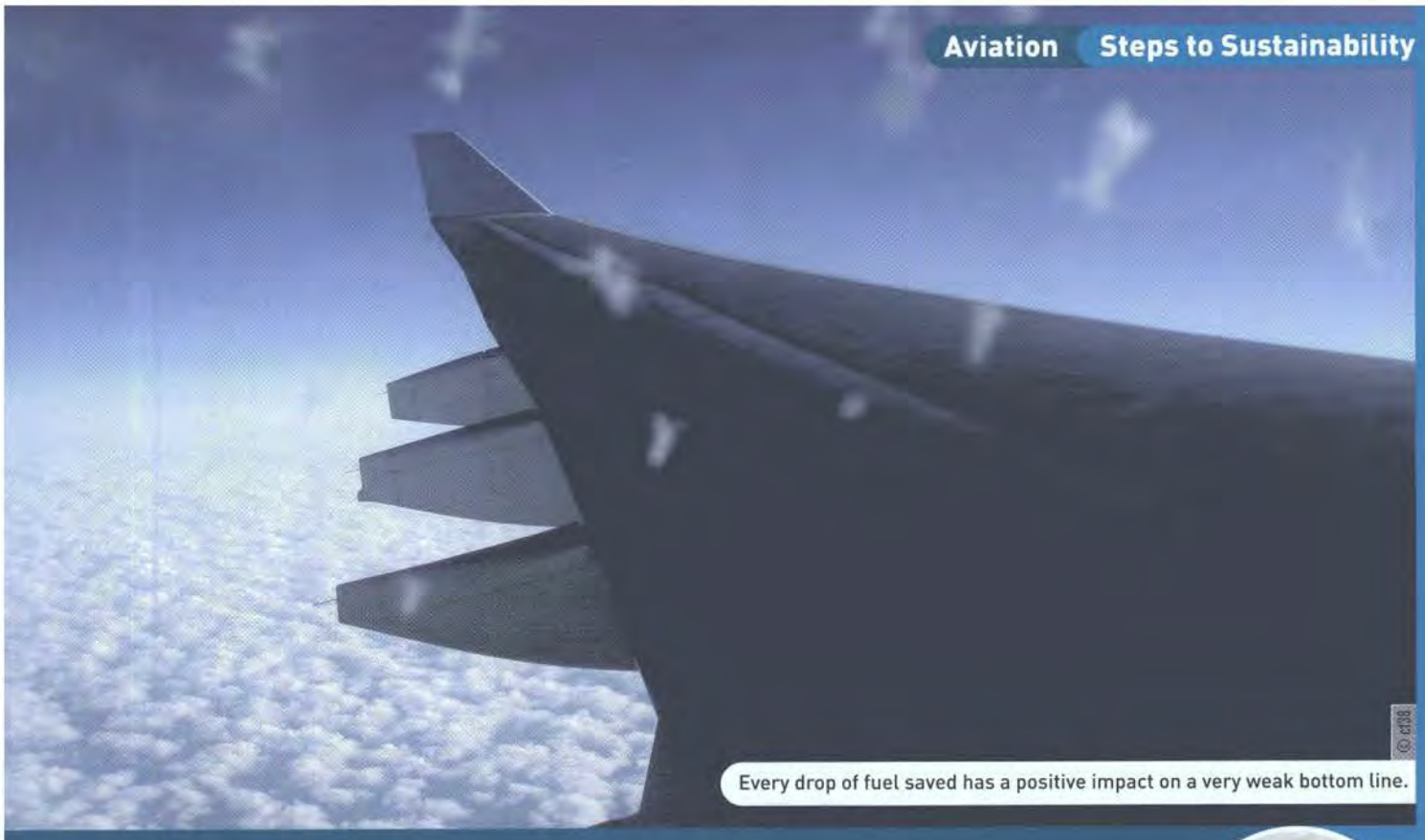
Today, efforts need to focus on finding, implementing and spreading smarter and more environmentally friendly transport solutions with the ultimate goal for a carbon free transport industry.

Niels Beuck is a policy adviser for CLECAT, monitoring EU legislation in the area of transport, logistics, customs and sustainability. His specialist topics are aviation, maritime transport, supply-chain security, sustainable logistics, European law and international and European relations.

Marco L Sorgetti was born in Turin, lives in Brussels and works for CLECAT, the EU level logistics, forwarding and customs services association. An entrepreneur for over 20 years, he has devoted part of his energies to the sector's associations. A former member of the Turin Chamber of Commerce, since 2000 he has worked as consultant, teacher and manager in logistics and trade facilitation; among other literature he has published a forwarding and transport manual (ISBN 88 8353 371 7).

CLECAT, the European Association for Forwarding, Transport, Logistic and Customs Services, has represented the European customs and logistics sector for more than 50 years. It represents the vast majority of national organisations of freight forwarders and customs agents both in the European Union and on a continental level. The most recent internal enquiry showed that CLECAT represents about 19,000 companies that employ over 1,000,000 people.

Rue du Commerce, 77
1040 Bruxelles, Belgium
Tel: +32 2 503 47 05 | Fax: +32 2 503 47 52
Email: info@clecat.org | Web: www.clecat.org



Every drop of fuel saved has a positive impact on a very weak bottom line.

Aviation's commitment to climate action

By **Tony Tyler**, Director General and CEO, International Air Transport Association (IATA)

Environmental responsibility is a pillar of global aviation – alongside safety and security. As with all industries, it is our license to grow. Moreover, improving environmental performance goes hand-in-hand with building stronger businesses. Next year fuel is expected to account for 32 per cent of airline operating costs and the industry is only expected to make a 0.8 per cent margin. Every drop of fuel that is saved has a positive impact on a very weak bottom line. Even in these difficult economic times, airlines are redoubling their efforts to reduce fuel burn and emissions with investments in new aircraft, alternative fuels and better operations.

The aviation value chain shares a common commitment to carbon reduction. In 2008 airlines, airports, manufacturers and air navigation service providers (ANSPs) agreed ambitious climate change commitments that make aviation a role model for other industrial sectors:

- Improving fuel efficiency by an average of 1.5 per cent per year to 2020;
- Capping net emissions from 2020 with carbon-neutral growth; and
- Cutting net emissions in half by 2050 (compared with 2005).

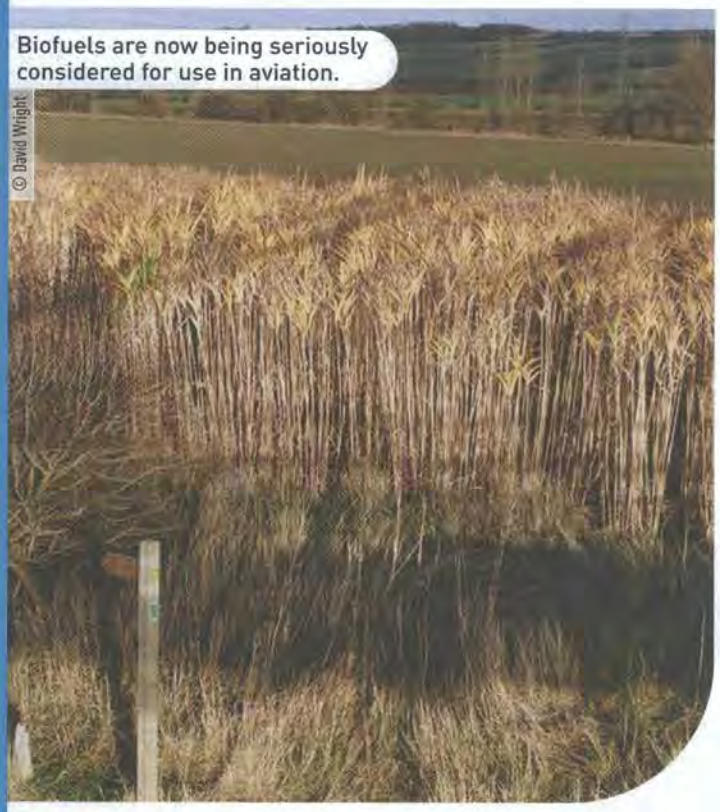
Aviation accounts for two per cent of global man-made CO_2 emissions. That will be about 650 million tonnes in 2012, when the expected load is 2.8 billion passengers and 46 million tonnes of cargo. In 2050 aviation aspires to carry 16 billion passengers and 400 million tonnes of cargo, with a reduced carbon output of 320 million tonnes.

That is a big challenge. To achieve it, the industry has a strategy based on four pillars:

1. Technology – principally cleaner aircraft and alternative fuels;
2. Operations – reviewing all aspects of how air transport operates, such as reducing weight;

> **“In 2050 aviation aspires to carry 16 billion passengers and 400 million tonnes of cargo, with a reduced carbon output of 320 million tonnes.”**

3. Infrastructure – investment in air traffic management and airports to find efficiencies;
4. Positive economic measures – using economic instruments to encourage investment in cleaner technologies or emissions reductions elsewhere.


Biofuels are now being seriously considered for use in aviation.

© David Wright

Endorsed by the International Civil Aviation Organization (ICAO), this strategy is the cornerstone of aviation's efforts to cut carbon. We have drilled down into the pillars, using independent experts, to verify how each element will play its part in meeting our targets. The strategy is robust and detailed, but some key points are worth illuminating.

On the technology side, the most obvious example is the current generation of advanced aircraft coming into service. Airlines are committed to spending US$1.3 trillion on 12,000 new planes over the decade to 2020. Each new generation of aircraft and engines is around 20 per cent more fuel-efficient than its predecessor. Seeing this repeated aircraft after aircraft over the industry's history has been a major contributor to a 70 per cent improvement in fuel efficiency over the last 40 years.

INFRASTRUCTURE

Infrastructure, in particular the air traffic management (ATM) system, is an important element of environmental progress. We know that billions of dollars and euros are being invested in modernising the ATM structure in the US and Europe. IATA supports this process. In fact, our concern is that the process is not moving fast enough. This is especially true in Europe, which has bottlenecks of inefficiency exacerbated by too many 'borders in the air' which add unnecessary route extensions on city pairs across the continent. The Single European Sky (SES) – the project supposed to eradicate these issues – is imperilled by lack of political will across the EU to make some hard decisions on ANSP consolidation and cost efficiency. Nevertheless, we remain convinced as to the inescapable logic of the SES. It promises so much, not least, in environmental terms, a 16 million tonne annual cut in CO_2 emissions. Again, this is an area where governments have the power to make a real difference.

BIOFUELS

The great story of technological innovation is about to get a new dimension with innovation in how aircraft are powered. Earlier in 2011, in a little-publicised but possibly revolutionary step, ASTM International's Committee on Petroleum Products and Lubricants approved the use of sustainable biofuels for commercial air services. For the first time aviation has an alternative to traditional jet fuel. This was the result of the significant testing programme that airlines from every corner of the globe participated in for the three years running up to the ASTM decision. Almost immediately, a swathe of airlines announced plans for sustainable biofuel flights. Five airlines, KLM, Lufthansa, Finnair, Interjet and AeroMexico, have already flown commercial passenger flights on sustainable biofuel.

“Each new generation of aircraft and engines is around 20 per cent more fuel-efficient than its predecessor.”

Sustainable biofuels offer up to an 80 per cent reduction in CO_2 emissions over their complete lifecycle, compared with jet kerosene. Importantly, they can be created from a wide variety of sources and materials, offering the possibility of local production and distribution. In the future biofuels will offer airlines security of supply and consistency of price, in a world where the oil price is likely to continue climbing.

But there are a number of challenges to overcome. First of all, a careful choice of crop and feedstock and optimisation of cultivation mechanisms will be necessary to ensure that the use of biofuel doesn't lead to greater emission than fossil fuel. Efforts are also needed to address broader sustainability and ethical questions such as water use, food versus fuel, and invasiveness and related biodiversity risks. In addition, for serious take-up to begin, sustainable biofuels need to be on a cost par with kerosene. It will take time to build up the infrastructure and deliver the volumes, but the work must begin now. We only need a relatively small amount of biofuels to reach our carbon-neutral growth target, but our 2050 target of the 50 per cent emissions cut is reliant on a plentiful supply.

We need oil companies and governments to step up. Big oil makes big money on aviation's US$200 billion fuel bill. They need to invest in and encourage sustainable biofuel production and distribution. Governments can help in three ways. Firstly, they can invest in research and development and incentivise large-scale biofuel production. For example, the Mexican government has launched a 'Flight Plan Towards Sustainable Aviation Biofuels' and expressed an aspiration to cover 15 per cent of national

Aviation is an instrument of peace and a generator of prosperity.

© James Cridland

aviation fuel demand with sustainable biofuel by 2020. Secondly, governments can help develop harmonised global sustainability standards to ensure biofuels do not compete with food supply and biodiversity. And thirdly, they can incentivise the use of biofuels.

> **“Aviation is a serious partner, committed to real reductions in its carbon emissions.”**

If these elements are in place, then biofuels will become a fact of aviation life even sooner than we dared to hope.

ECONOMIC MEASURES

One area where governments are taking action is on positive economic measures – our fourth pillar. ICAO's 190 contracting states agreed to principles for a global emissions trading or compensation scheme in 2010. ICAO also committed to deliver a global framework for market-based measures at its next assembly, which is less than 24 months away. The industry is fully supporting ICAO in the challenging task to achieve a framework that does not distort markets, recognises past and future efforts, supports environmental investments and ensures that airlines are not charged for their emissions more than once.

However, no matter how cleverly conceived, this cannot be a solution to a global problem. Moreover, regional schemes increase the risk of a layering of taxes and charges. Already in Europe we see the UK's Air Passenger Duty collecting £2.5 billion from air travellers – enough to offset all UK emissions related to aviation four times over. Europe's planned inclusion of aviation into its emissions trading scheme makes no promise for the elimination of this or any of the other European taxes introduced for climate change purposes.

A MESSAGE TO GOVERNMENTS

Our message for governments attending COP17 is reassurance that aviation remains committed to its ambitious emissions reduction goals. Co-operation and partnership – with industry and among governments – is the key to achieving the targets. The place to solidify these is ICAO, which is the only organisation that can set a global strategic framework for aviation – including for economic measures.

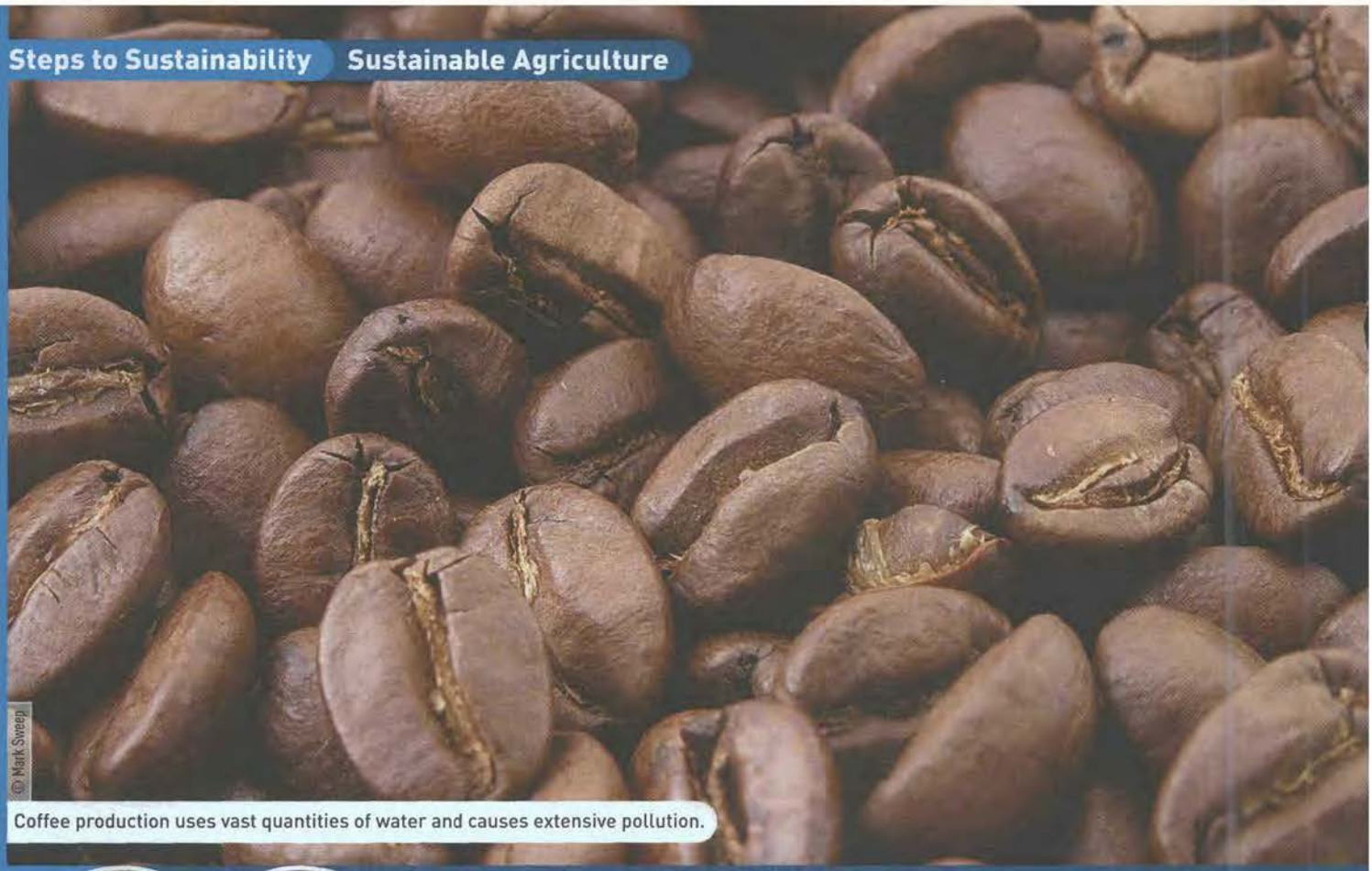
Aviation is an instrument of peace and a generator of prosperity – both material and of the human spirit. It is the collective responsibility of industry and government to ensure that it can continue to fulfil this unique role as a catalyst for sustainable development with the highest levels of environmental responsibility.

The Delegates at this COP17 have a great opportunity to show that the rhetoric on reducing carbon emissions is evolving into concrete, practical action. Aviation is a serious partner, committed to real reductions in its carbon emissions. We look forward to working with world governments who share this goal.

Tony Tyler has been Director General and CEO of IATA since July 2011. Prior to joining IATA, Tyler built his career at John Swire & Sons in Hong Kong. From 1978 he moved within the Swire Group to Cathay Pacific Airways, eventually serving as its Chief Executive from July 2007 to March 2011. Before this, Tyler held various senior positions at the airline, including Chief Operating Officer (2005-2007) and Director of Corporate Development (1996-2005). Internationally, Tyler served on the IATA Board of Governors from 2007 to 2011 and was its Chairman from June 2009 to June 2010.

The **International Air Transport Association** (IATA) is the global trade organisation of one of the most dynamic industries in the world. Over 60 years, IATA has developed the commercial standards that have built global air transport. Today, IATA's mission is to represent, lead and serve the airline industry. Its members comprise some 230 airlines – the world's leading passenger and cargo airlines among them – representing 93 per cent of scheduled international air traffic.

IATA
800 Place Victoria, PO Box 113, Montreal, H4Z 1M1
Quebec, Canada
Tel: +1 514 874 0202 | Fax: +1 514 874 9632
Web: www.iata.org



© Mark Sweep

Coffee production uses vast quantities of water and causes extensive pollution.

Enhancing sustainable energy in the Central American coffee sector

By **Vera Espindola Rafael**, Field Development Co-ordinator for Latin America and **Britta Wyss Bisang**, Standards & Certification Manager for UTZ Certified

Agriculture is expected to be highly vulnerable to climate change; however, at the same time, agriculture is an important contributor in creating the conditions for climate change. Through the promotion of good agricultural and environmental practices, such as the prohibition of deforestation of native forests, correct and/or reduced use of fertiliser and the planting of shade trees, farmers can contribute to the mitigation of climate change. By implementing the UTZ Certified Code of Conduct, coffee producers already positively address a variety of water and climate issues. However, acknowledging that climate change is a threat to coffee producers and coffee production worldwide, it is appropriate to look into further measures to address the problem.

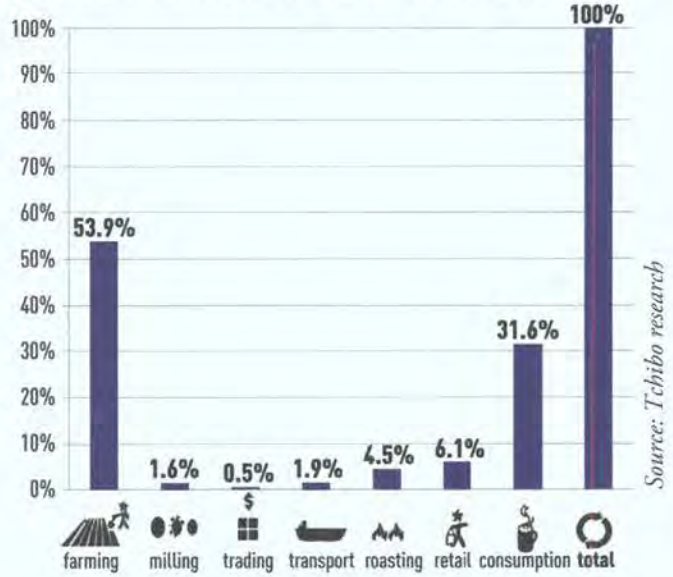
Coffee production, like agriculture in general, uses vast quantities of water, and also causes extensive pollution, primarily by introducing 'non-point-source' contaminants into the waste flow. Runoff from agricultural fields often contains eroded soil, fertilisers, animal manure, or pesticides that together form a major source of water pollution. Decreasing availability and pollution of waters is a subject of major global concern.

COFFEE PROCESSING: ONE OF THE MAIN GHG EMISSION SOURCES

Background research has been commissioned by UTZ Certified to identify the possibilities for including climate change aspects in certification. The research shows key climate change drivers responsible for greenhouse gas (GHG) emissions in the coffee industry and provides valuable starting points from which to address them. The key drivers are: deforestation; land use change and degradation of land; land management practices; and processing of coffee. These results are also supported by research commissioned by the large coffee roaster Tchibo, looking into the distribution of carbon emissions along the coffee supply chain (see Figure 1 overleaf).

Coffee processing is an energy-intensive process and a potential source of contamination. Coffee waste – i.e. pulp – and waste water that leave the coffee processing units are rich in organic matter and are damaging to natural water bodies if not treated correctly. Furthermore, a first assessment carried out in Central America by UTZ Certified's partner Solidaridad showed that one of the factors in coffee production that has a negative impact on climate is

Figure 1. Share of carbon footprint along the coffee chain.



the methane produced in the fermentation process. Methane is a much more damaging GHG than CO_2.

CHALLENGES FROM COFFEE PROCESSING

After harvesting the coffee, the ripe berries need to be processed as soon as possible. The coffee beans must be removed from the fruit and dried before they can be roasted. This can be done either by the dry or wet method.

The wet method is more commonly used in the majority of the coffee producing countries, such as Nicaragua and other countries in Central America. It requires the use of specific equipment and substantial quantities of water. When properly done, it ensures that the intrinsic qualities of the coffee beans are better preserved, producing a green coffee which is homogeneous and has few defective beans. The process of extracting the beans from coffee cherries generates enormous volumes of waste in the form of pulp and residual water. The waste water has a high content of organic matter and acidity. The waste water in coffee has chemical oxygen demand (COD) values that vary between 18,000 and 30,000 milligrams per litre. The oxidation of the organic matter in the water is done by means of microflora of bacteria that feed on the matter and consume the oxygen in the water. In case of a substantial discharge of waste water into a natural water body, typically a river, the oxygen in the river is depleted, thereby choking and destroying the aquatic fauna and flora, such as fish, crabs, micro-organisms and various river plants.

Discharges from coffee 'beneficios' (processing plants) are a major source of river pollution in northern Latin America. The Guatemala-based Instituto Centroamericano de Investigación y Tecnología Industrial has estimated that over a six-month period during 1988, the processing of 547,000 tonnes of coffee in Central America generated 1.1 million tonnes of pulp, and polluted 110,000 cubic metres of water per day, resulting in discharges to the region's waterways equivalent to raw sewage dumping from a city of four million people.

STRINGENT REQUIREMENTS AND PROFESSIONAL DEVELOPMENT

UTZ Certified is convinced that increasing sustainability should also reinforce the independent position of farmers. This is why farmers are trained in the professional development of their agricultural practice and operational management. This improves the quality of their products and allows them to produce higher volumes at lower costs. This in turn enables the farmers to negotiate a better price for a better product and to improve their standard of living. Moreover, farmers who work with UTZ Certified in the global marketplace receive a premium for their crop, and pay nothing for taking part in the programme.

By working with a strict Code of Conduct, UTZ Certified sets stringent requirements for the farmers when it comes to the sustainable growing of coffee, cocoa and tea. Farmers are trained in the area of business skills, labour conditions and environmental management, and their operational management is checked by independent third parties. The UTZ Certified tracking system subsequently guarantees that the raw materials have actually been grown and harvested in a responsible manner.

PROJECT ON COFFEE WASTE AND BIOGAS

Using coffee waste water to produce biogas and then use the energy within the coffee supply chain appears to be a viable option to consider. Methane is generated from coffee waste by anaerobic bacteria. Methane gas can be used for various purposes; specifically in coffee processing, it has been proposed to use it to generate electrical energy in a dual fuel setup, substituting up to 70 per cent of the diesel used in the generator of the pulping machine. It can also be used to generate a substantial amount of the heat needed to dry the processed coffee, or can substitute other fuels such as the ones used for kitchen stoves.

The goal of the project *Energy from Coffee Waste in Central America* is to use the coffee waste water to produce biogas in a controlled way, thereby avoiding the emission of methane from fermentation of coffee waste, and then use the biogas produced as an energy source. To achieve this goal, the project is focused on building experience of the optimisation and standardisation of the coffee waste bioreactors and digesters under the prevailing conditions in Central America. Based on the findings of the project, the plan is to later make the technology available to a large number of coffee processors.

TABLE 1. PRODUCTION AND POLLUTION FOR THE THREE TYPES OF PRODUCER

	Est. green coffee production	Est. biogas production (m^3 per day)
Large exporter	1,361-2,268	2,000
Co-operative, central mill	27.21	30-40
Co-operative, smallholders	11.47 (average)	3-4

In order to learn as much as possible a representative sample of the Nicaraguan coffee sector was taken, and three organisations were chosen for the first coffee season, 2010/2011:

- A large exporter with its own beneficio, CISA;
- A co-operative with a central beneficio, CECOCAFEN; and
- A co-operative with each smallholder processing the coffee by themselves, El Polo.

The projects are implemented as business cases. This gives a clearer understanding of the scale of the investment, and the different financial returns of the proposed waste treatment systems, leading to an evaluation of each system. The business cases then provide a better understanding of the situations in which the proposed systems are beneficial, either economically, environmentally or socially. The business cases also provide valuable data on the economics of different biogas usage options. This will be useful for the potential rollout of the project, mainly the selection of locations.

CISA:

"With this project, we reduce energy as well as the costs. And the biogas is used for our beneficio."

The waste treatment and bio-energy systems at the smallholders' co-operative proved to be difficult to evaluate on financial aspects only. The benefits from the system have been measured so far on a qualitative level only. Better management of waste is resulting so far in cleaner surroundings for the beneficio (and the smallholder farmer's house that is located close to it) and a lower threat to soil and water quality. The smallholder, but also the community, is benefiting from the lower environmental impact. Although the waste quantities are fairly small, the fact that there are literally thousands of this kind of individual processing unit increases the urgency of offering waste treatment to beneficios of this kind.

Additionally, the use of biogas generates a benefit for the family when the firewood used for cooking can be (partly) replaced by biogas, thereby reducing the work of collecting the firewood, providing a healthier working environment in the kitchen and potentially greater ease of use.

WIFE OF PRODUCER, COOPERATIVA EL POLO:

"My health hopefully will improve now because I am using less firewood. The smoke is bad for your health; so my whole family is now benefiting."

OUTLOOK AND FUNDING

Since July 2011, the project has also been launched at two co-operatives in Honduras, COAGRICSAL and CAPUCAS (HQC), and at a farm in Guatemala, Finca El Cascajal.

The lessons learnt from the pilot activities in the three countries will be compiled. This will comprise data, information and conclusions on the technical specifications of the biogas installations, the economic and environmental benefits. This knowledge will be transferred through a train-the-trainers module in the UTZ Certified network where processing and other technical staff will be invited for one of the training days.

The funding for this project was awarded to UTZ Certified within the framework of the Biomassa Mondiaal fund, based in the Netherlands. Agentschap NL, an agency of the Netherlands Ministry of Economic Affairs, has been mandated to provide the subsidy. The Global Sustainable Biomass programme aims to contribute through this fund to the realisation of two Millennium Development Goals in particular: MDG 1 (eradicating extreme poverty and hunger) and MDG 7 (creating a sustainable environment). Their goal is to support developing countries in making their biomass production sustainable for energy use, and the certification of this to allow access to local or international markets.

The challenge of the project is to scale this technology up for the rest of the Central American region, as at least co-funding is needed in order to initiate its implementation with the producers and processors.

Vera Espindola Rafael is Field Development Co-ordinator for Latin America, UTZ Certified.

Britta Wyss Bisang is Standards & Certification Manager for UTZ Certified.

UTZ Certified is one of the largest sustainability programmes for coffee, cocoa and tea in the world: one-third of all coffee that is sustainably traded worldwide is certified by UTZ. Brands that have committed themselves to the sourcing of (sustainable) UTZ Certified raw materials are global market leaders such as Sara Lee, Mars, IKEA, Nestlé, Friele, Migros and Albert Heijn. Since these companies buy raw materials in large volumes, we can improve the standard of living of as many farmers as possible at a high pace.

UTZ Certified
De Ruyterkade 6, 1013 AA, Amsterdam, The Netherlands
Tel: +31 20 530 8000 | Fax: +31 20 530 8099
Email: info@utzcertified.org | Web: www.utzcertified.org

Safeguarding the environment with information disclosure

Slowing the flow of communications can greatly increase a company's understanding of the issues.

By **Ernst Ligteringen**, Chief Executive, Global Reporting Initiative (GRI)

Is it possible to imagine a world of voluntary financial reporting? What might happen if, instead of following decades of agreed financial disclosure metrics, observed by regulators, we just asked companies to tell us what they wanted to – or nothing at all? In many respects, this is precisely the situation we are facing regarding environmental disclosure – including the data we all need about the effects of business on climate change. This situation is now shifting, as it must. We need an economic model that factors in care for the environment.

Observers are very much aware of the rapid increase in companies', investors' and civil society's interest in corporate environmental performance, and the context in which it matters most: sustainability. The Global Reporting Initiative (GRI) has pioneered, and continues to improve, a sustainability reporting framework that is widely used around the world. By establishing widely agreed metrics, GRI's reporting guidance ultimately aims to be one of the tools that help all organisations to mitigate harm and improve environmental management, in a sustainable global economy.

A sustainable global economy means economic prosperity, social justice and environmental care, in the service of all people. Sustainability reporting prepares companies and organisations for the transition to sustainable, responsible practices. And sustainability reporting will of course play a vital role in maintaining a sustainable economy, since it makes available the ongoing data that is similarly provided for our present day economy by financial reporting.

A NEW AUDIENCE

By 2050 there may be nine billion people on earth, many of them in the developing countries where environmental and social impacts are most sharply felt, and where the desire for something better will be strongest. We already consume more of the planet's renewable resources than it can regenerate. In future we can expect to use very different means to feed, house, and transport ourselves, and to communicate. And so demands for environmental disclosure are rightly increasing, and coming from new audiences.

Simultaneously, more and more of the world's biggest and best managed companies recognise that environmental performance is fundamental to their future, and that integrating sustainability is essential for value creation. The collaborative effort to establish the 'Why' for reporting environmental and sustainability performance is gradually paying off. But this sets the stage for the next important effort – 'How'?

REPORTING IN THE WIDER CONTEXT

To remain on the 'Why' for a moment; reporting requires all organisations to take a topic more seriously. When issuing formal communications, organisations involve many more reviewers and perspectives. This can slow the flow of communications but greatly increases a company's understanding of the issues at hand. When embedded as a cycle, sustainability reporting is intended to build on itself, to enable organisations to see things they would not have seen before. Financial reporting alone is no longer an adequate measure of a company's viability, never mind able to help it towards greater heights of innovation, or indicate the long-term viability of products and operations.

> **"A sustainable global economy means economic prosperity, social justice and environmental care."**

Sustainability reporting involves systematic dialogue with stakeholders. But there are also silent stakeholders that cannot speak for themselves: flora, fauna, and ecosystems. By considering the perspective of these stakeholders and completing the reporting cycle, organisations can build and maintain the public trust that is vital for any company. Organisations can improve their efficiency and productivity,

saving money; influence the decisions of consumers and investors; and, most importantly, they can limit their impacts on the environment.

GRI's Performance Indicators offer guidance on issues related to climate change, including energy and water consumption and efficiency, biodiversity impacts, greenhouse gas and other significant air emissions, and the financial implications, risks, and opportunities presented by climate change.

But climate change reporting is not just a technical exercise: As mentioned, it needs to be seen in the context of sustainable development. By requiring disclosures to be presented in a more comprehensive sustainability context, GRI's Framework is uniquely positioned to ensure that reporting related to climate change is linked to other critical sustainability issues such as biodiversity, human rights and population displacement. Climate change and social issues – perhaps the two most pressing topics in sustainability – are interrelated. Consequently, they need to be measured and analysed in an interrelated fashion.

PLANNING SUSTAINABILITY INFORMATION

Now for the 'How' to report. An organisation has recognised the benefits of reporting and made the decision to improve its transparency. Before deciding what to do next, it needs to work out who wants – who needs – information on its sustainability performance. The emerging players in the sustainability data field share something in common: the ownership of large portfolios of companies. These banks, insurers, investors, stock exchanges and countries not only have a stake in companies, but also in the environment – for a business to operate well in the long term, it must be aware of, and communicating, its sustainability impacts.

"In future we can expect to use very different means to feed, house, and transport ourselves, and to communicate."

These 'portfolio' players – relatively new audiences for sustainability reporting – are looking for transparency and comparability. They need to look at one company against another, to assess the integration of sustainability into corporate strategy more centrally, to gauge their energy efficiency performance, or evaluate the quality of their supply chain management. They are starting to ask for comparable sustainability performance data, through lending and insurance requirements, listing requirements and regulation.

COMPARABILITY

Benchmarking is powerful, both for those with a stake in companies and for the companies themselves. It is a chicken and egg situation – benchmarking both relies on and results in comparability. As companies report, they benchmark; as they benchmark, they develop best practice by sharing knowledge. It is in these areas that reporting has much to contribute, and new tools are emerging that are driving this contribution.

Like many data providers, ratings agencies and analysts, Bloomberg has started compiling sustainability data and making it available on some 350,000 terminals worldwide. This is giving investors instant access to a set of information – some of it based on GRI's Indicators – and helping them make informed decisions. The data is there, and it is up to the audience to use it in the right way. Look at the signatories of the Carbon Disclosure Project (CDP) and the UN Principles for Responsible Investment. The number of companies disclosing energy and carbon emissions using the CDP Questionnaire has increased tenfold since 2003. Entire sectors are being compared and contrasted on qualitative and quantitative indicators.

But growth in reporting has so far been linear. The world needs this growth to be exponential. Growth will be boosted by firmer guidance for disclosure, which is now being promoted from diverse sources, including governments and stock exchanges.

Regulation can result in more reports and better reporting – this is GRI's goal, and the premise behind the call for 'report or explain' regulation. This is simple regulation,

PROMOTING DISCLOSURE

Two of the most encouraging examples of disclosure promotion, Denmark and the Johannesburg Stock Exchange, have one thing in common: a simple approach to regulation. They both require companies under their jurisdiction to disclose information related to sustainability performance, or explain their silence.

More than 450 companies listed on the Johannesburg Stock Exchange are required to apply the King Code of Governance, which recommends producing an integrated report in place of annual financial and sustainability reports, or explain why not. The listing requirement has gained widespread support, and there has been a ripple effect to other major exchanges worldwide – the New York Stock Exchange, Singapore Stock Exchange, Deutsche Boerse in Germany, BM&FBOVESPA in Brazil and the Stock Exchange of Thailand are all taking sustainability into account. While few exchanges have listing rules in place beyond governance, indexes and guidance for sustainability information are gaining momentum as stock exchanges examine new business opportunities and the potential for increasing revenues, safeguarding reputation and minimising operational risk.

In Denmark, large businesses must disclose their sustainability policies, including how these policies are translated into actions, what the business has achieved as a result and their expectations for the future, or explain why not. According to the Danish government, the legal requirement to report is creating growth, strengthening international reputation and competitiveness, and motivating more businesses to report their sustainability performance data.

setting a minimum requirement (explain) but leaving the top open for innovation and improvement (report). As explained above, some governments and stock exchanges have already adopted this approach, but there is more to be done to make reporting standard practice.

Collaboration is key to getting more useful, reliable information to the market – to getting more reports and better reporting. Better reporting means information that is clear, relevant, meaningful and comparable. To achieve comparability, GRI works closely with other organisations, and aims to harmonise with different frameworks and principles – including the UN Global Compact, the OECD and its Guidelines for Multinational Enterprises, and ISO 26000. Like the CDP, GRI bases its emissions guidance on the most widely used international calculation standard: the GHG Protocol Corporate Reporting and Accounting Standard developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). Furthermore, GRI offers guidance on how different reporting frameworks are linked, including a document on the alignment between GRI's Framework and the CDP Questionnaire. Such tools help ensure that the questionnaires and requests for isolated data can be integrated and contextualised with wider sustainability disclosure.

“Better reporting means information that is clear, relevant, meaningful and comparable.”

Comparability is also an objective of the International Integrated Reporting Committee (IIRC). The IIRC is currently developing guidance for organisations that want to report their sustainability impacts in the context of their financial performance, integrated together. The IIRC Framework will be mutually complementary with the GRI Framework, and with global financial reporting standards.

REPORTING GUIDELINES

GRI is now working on the next generation of Sustainability Reporting Guidelines – G4 – which aims to advance harmonisation with other frameworks and principles, including the IIRC. G4 will also help make reports more relevant and comparable, by including improved technical definitions. Many stakeholders use GRI's Guidelines to assess companies' performance. But even those companies that follow the Guidelines can interpret the guidance in different ways, resulting in a difficult comparison between masses and volumes, decimal and imperial and normalised data. G4 will provide reporting guidance that is fit for mainstream use, and that prepares companies for comparison and benchmarking.

The practice of sustainability reporting can improve all reporting organisations. A constant theme of GRI's reporting guidance is the necessity for ongoing stakeholder engagement and ongoing feeding back of report data to directors and executives. The revealing of information is not the sole goal of reporting. Rather, it is the way such information is fed back to senior decision-makers in order to influence policy, strategy and operations that better represents one of reporting's major uses.

“G4 will provide reporting guidance that is fit for mainstream use, and that prepares companies for comparison and benchmarking.”

What companies should really be thinking about is how they can improve sustainability performance. In a rapidly changing world, with a growing population and depleting natural resources, how can companies mitigate risk, take opportunities and innovate? How can finance and sustainability be linked in strategy, to ensure that companies are positioned to be part of the solution to an unsustainable economic model? How can companies reduce their impacts and help support the world in its necessary move to a sustainable global economy? Sustainability reporting can indicate valuable options for those companies that choose to start their reporting journey.

Ernst Ligteringen has been Chief Executive of GRI since 2002, when it was established as an independent organisation with an international secretariat in Amsterdam. Ligteringen is a member of GRI's multi-stakeholder Board of Directors. Before joining GRI, he worked for more than 20 years at various non-governmental and international organisations. His positions included postings in Africa, the Caribbean, Latin America, Asia, the Middle East and Europe, as Executive Director of Oxfam International, Director of Programme Co-ordination of the International Federation of the Red Cross and Red Crescent Societies, and Consultant to the World Commission on the Social Dimension of Globalisation at the ILO.

The **Global Reporting Initiative** (GRI) drives sustainability reporting by all organisations. GRI produces a comprehensive Sustainability Reporting Framework that is widely used around the world, to enable greater organisational transparency. The Framework, including the Reporting Guidelines, sets out the principles and indicators organisations can use to report their economic, environmental, and social performance. GRI is committed to continuously improving and increasing the use of the Guidelines, which are freely available to the public.

Global Reporting Initiative
Metropool Building, 5th Floor, Weesperstraat 95, PO Box 10039
1001 EA, Amsterdam, The Netherlands
Tel: +31 (0)20 531 0000 | Fax: +31 (0)20 531 0031
Email: reportservices@globalreporting.org
Web: www.globalreporting.org

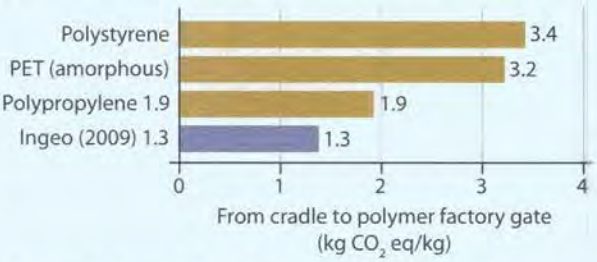
A decade of sustainable materials innovation: Ingeo, bioplastics from plants, not oil

In 2002, NatureWorks (www.natureworksllc.com), a company dedicated to more sustainable, innovative and environmental products, introduced the world to its family of Ingeo™ biopolymers. Since then, NatureWorks has been working across a range of industry sectors to demonstrate that what was once just a great idea is today a commercial reality.

The production of Ingeo replaces petroleum with annually renewable plant sugar, reducing fossil fuel dependency and positively contributing towards carbon-neutral manufacturing and more sustainable processes and products. NatureWorks' production of Ingeo uses significantly less non-renewable energy and generates significantly lower CO_2 emissions than all traditional oil-based polymers. Compared with PET, for example, Ingeo reduces fossil fuel usage by 47 per cent and greenhouse gas emissions by 59 per cent (Figure 1). Certification and rigorous credentials are critical in this arena, and NatureWorks backs its claims with a peer reviewed, published eco-profile.

Today, Ingeo is being used across a number of consumer markets which range from health and beauty, through food packaging and serviceware, to consumer electronics – spanning over 40 new lifestyle product families. Successfully introducing innovative, industry-leading materials requires close co-operation with every step of the manufacturing and supply chain to deliver the finished consumer product. The adoption across different industries and product families would not have been possible without the commitment of commercial partners working with Ingeo.

Figure 1. Benchmarking Ingeo for non-renewable energy use.



Source: 'Industrial Biotechnology', August 2010, p 223.

Looking at the range of Ingeo products now available to the consumer Sula Bruce, Project Director, Climate Action, commented, "That products can be made by literally transforming the carbon that was present in the atmosphere and contributing to global warming, into the very backbone of these everyday items is very exciting and innovative. Climate Action is about building partnerships for a green economy and we are pleased to have Natureworks as a partner".

For its third year at the UNFCCC's Conference of the Parties (COP) this year in Durban, South Africa, NatureWorks will be partnering with Climate Action to develop a series of activities on the theme of 'Working Together: Saving Tomorrow Today'. This campaign's goal is to increase awareness of the many ways NatureWorks are contributing to COP17's and Climate Action's target of reducing CO_2 by creating quality sustainable product alternatives for businesses and consumers alike.

The three case histories in the following sections show practical applications of Ingeo bioplastics.

NatureWorks has enjoyed institutional recognition alongside commercial success. In 2011 the company received an award as a 2011 Leader of Change at the annual Global Conference for Social Change on behalf of the United Nations Office for Partnerships and the Foundation for Social Change. The award recognises visionary executives of companies, financial institutions and advocacy groups that have demonstrated an exemplary commitment to the pursuit of sustainability, whereby environmental and social performance are embedded in the competitive strategy of the firm or organisation. In the photo, from left to right: Louise M Guido, CEO, Foundation for Social Change; Steve Davies, Director, Public Affairs, NatureWorks; Will Kennedy, Senior Programme Office, United Nations Office for Partnerships.

Steve Davies, Global Director of Marketing & PR, Natureworks LLC (Centre).

INGEO CASE HISTORIES

DANONE

Andreas Knaut
Danone Director Corporate Communications, Health and Sustainability

CA: ***What efforts is Danone making to increase sustainability and reduce the environmental impact of its products?***

As a leading company in the area of milk freshness, Danone takes responsibility for the health and well-being of its customers, for its employees and business partners, for the preservation of the environment and nature, and for sustainable value creation. To fulfil these responsibilities, we are actively involved in a range of areas: **Sustainable economy** – With the Ecosystem Fund, for example, Danone supports the development of sustainable business models within its market. **Health and nutrition** – Danone keeps developing its product recipes according to the latest scientific nutritional recommendations. For instance, since market entry in 1981, the energy content of Danonino in Germany has been reduced by more than 35 per cent. **Social engagement** – Danone pursues projects that both fight poverty and improve the supply of healthy foods. One example is the Social Business initiative in Bangladesh. Since 2007 the company has been producing a yogurt enriched with vitamins and minerals to fight the consequences of malnutrition among children. At the same time, the dairy plant strengthens the local economy and contributes towards fighting poverty.

CA: ***What is your experience with Ingeo?***

Another very important area for us is our environment: Danone wants to deal responsibly with all its natural resources. We have committed to reducing our CO_2 footprint by 30 per cent by 2012, and we work on our packaging material to make it more sustainable. In addition to continually reducing the weight of packaging, our Activia packaging is now made of Ingeo PLA. The new cup is the result of a collaboration between Danone and the WWF. The switch will improve the carbon footprint of the cup by 25 per cent, and use 43 per cent less fossil resources compared with the previous cup, according to a life cycle assessment conducted by the Heidelberg-based IFEU (Institute for Energy and Environmental Research). For more information see **http://fleishmaneurope.de/Activia-PLA-Becher.**

BIOSERIE

Kaya Kaplancali
Chief Executive Officer, Bioserie

CA: ***How is Bioserie looking to become more sustainable?***

We continuously seek to use plant-based and sustainable raw materials for our products and our packaging. We also seek to minimise resource waste by outsourcing our needs as much as possible – we use outside capacity that is already available, rather than duplicating resources. We choose environmentally responsible vendors, optimise logistics and use carbon-neutral shipping as much as possible.

CA: ***What practical steps has Bioserie implemented to address your environmental responsibilities?***

Ever since our inception, we chose to use bio-based materials for production, such as recycled and FSC certified paper, and bioplastics such as Ingeo. Our packaging design and materials are continuously adjusted to cause less waste. Our outsourcing model was a success, and we were actually able to deploy a streamlined and almost completely outsourced supply chain.

CA: ***Tell us about Ingeo plastics and what they bring to your industry?***

Ingeo plastics have allowed us to create a new category of products, and have proved that it is possible to develop and market environmentally responsible consumer durables.

CA: ***How have customers reacted to your product? Has this been a positive experience?***

We feel that consumers with environmental awareness have reacted strongly and positively to our Ingeo-based bioplastic products. We believe the overall reaction justifies our effort to continue to use biopolymers in our value proposal. For more information see **www.bioserie.com**

ELECTROLUX SMALL APPLIANCES

Cecilia Nord
Vice President Sustainability at Electrolux Small Appliances

CA: ***How is your company to become more sustainable?***

In consumers' homes, appliances represent about 20 per cent of the climate impact. We are striving to reduce our products' share of that impact by providing products which are at the forefront in our industry in terms of sustainability, and also work with engaging consumers to increase their awareness and knowledge.

CA: ***What practical steps has your company implemented to address your environmental responsibilities?***

Our Green range of vacuum cleaners and bags was launched last year, giving our consumers the possibility to choose a solution with less impact on the environment, irrespective of which type of product they need. This has meant an active step into new, more sustainable materials such as recycled polymers and bio-based plastics, which we are continuously probing further into.

CA: ***Tell us about Ingeo plastics and fibres, and what they bring to your industry and market.***

Ingeo bio-based polymers represent a real innovation and a possibility for us to improve the sustainability of our products, without sacrificing anything in product performance, or quality.

For more information see **www.electrolux.com**

We generate large volumes of waste which impacts on the environment and contributes to greenhouse gas emissions.

Decoupling economic development and waste generation

By **Dr Suzan Oelofse**, Central Branch Chairperson, Institute of Waste Management of Southern Africa (IWMSA)

Increased waste generation is an unintended consequence of economic development. At present we already use more natural resources than the earth can sustain, and in the process we generate large volumes of waste which impacts on the environment and contributes greenhouse gas emissions that are more harmful to the atmosphere than CO_2. Patterns of unsustainable production and consumption must be altered for a sustainable future. This article the author outlines some of the considerations that drive a modern waste management enterprise.

CONSUMPTION OUTSTRIPS THE EARTH'S SUPPLY CAPACITY

The 2010 *Living Planet Report* of the WWF reports that our footprint exceeded the earth's bio-capacity – the area actually available to produce renewable resources and absorb CO_2 – by 50 per cent in 2007. In reality this means that already in 2007 we were consuming about 1.5 times what the earth can sustain. Yet economic development remains the ultimate goal of all nations, putting more pressure on both renewable and non-renewable resources. With indications of a strong correlation between a country's GDP and waste generation, further economic growth in any country will inevitably lead to increased consumption of goods and services and consequently an increase in waste requiring collection, treatment and final disposal.

UNEP:

"We now have evidence of unprecedented environmental changes at global and regional levels. These are due to human activities in an increasingly globalised, industrialised and inter-connected world, driven by expanding flows of goods, services, capital, people, technologies, information, ideas and labour, even affecting isolated populations (2007)."

WHAT IS WASTE?

The answer to this question forms the basis of all laws and regulations that govern national and international waste markets (treatment methods, industrial facilities and exchange). Waste historically was disposed without consideration for the environmental consequences, or the re-use or recycling potential. The management of waste, both locally and internationally, has been incorporated into legislation to protect both the environment and human health from any adverse effects of disposal.

The internationally accepted 'waste hierarchy', as first accepted into policy by the European Community in the Framework Directive of 1975, is aimed at preventing waste where possible; re-using, recovering and recycling waste to reduce volumes; treating the waste to render it less hazardous or harmful to the environment; and disposing of unavoidable waste to landfill as a last resort. The successful implementation of the waste hierarchy largely depends on its translation into policy, strategy and legislation.

CONTRIBUTION OF WASTE TO GLOBAL CHANGE

The 2006 World Waste Survey estimated the quantity of waste collected worldwide at 2.5 to 4 billion tonnes per annum. The global average waste generation rate is in the order of 0.7 kg per person per day. Waste affects resources on two fronts. Firstly, a wasteful society puts unnecessary pressure on the resource base due to overconsumption of natural resources. Secondly, waste that is not properly managed impacts on the natural environment through its potential to cause pollution (air, water and soil pollution).

"A wasteful society puts unnecessary pressure on the resource base due to overconsumption of natural resources."

The 2006 Environmental Outlook Report for South Africa, estimated that waste from households, commercial enterprise, institutions and the manufacturing sector was about 13.5 to 15 million tonnes annually. In addition, industrial waste handled and disposed of on site was estimated to be about 22 million tonnes per annum. The greenhouse gas emissions from this waste according to the Greehouse Gas Inventory of South Africa (2009) are in the order of 8.09 million tonnes of CO_2 equivalent. In addition, production of consumer goods also contributes to greenhouse gas emissions and wasted consumer goods therefore add to this burden. As WWF commented in 2010, "In order to secure the future in all its complexity for generations to come, governments, businesses and individuals urgently need to translate these facts and figures into actions and policies – as well as anticipate both future opportunities and obstacles in the path to sustainability."

WASTE MINIMISATION

In general consumers have an increasingly 'throwaway' culture. One example of our wasteful society is the urge to keep up with the latest technologies. Cell phones, computers and other electronic equipment are replaced while still in perfect working order, adding to the mountain of electronic waste. Acknowledging that it is sometimes cheaper to replace broken equipment than to have it repaired, with waste minimisation in mind, one should rather repair than replace, even if it entails paying more. This may seem impractical, uneconomical and optimistic, but the reality of diminishing natural resources and unsustainable consumerism cannot be ignored. What may seem to be a saving to the individual may result in a much higher cost to society as a result of the ever-increasing waste stream that needs to be managed.

In reality, minimising consumption of natural resources and minimising the generation of waste means that every individual has to start thinking and rethinking about what they buy and what will happen to consumer goods when no longer in use, i.e. disposed of as waste. If we are serious about minimising waste, we must refrain from buying unnecessary goods, or replacing goods that are not broken, or if broken, can be repaired. Even buying essential items will require a conscious decision on, for instance, buying the item with the least packaging material, highest recycled content or highest potential to be recycled at the end of its lifetime. For business and large organisations, implementing this approach may require a change in procurement policies.

A WASTE MANAGEMENT SYSTEM

INDUSTRIAL ECOLOGY

Industrial ecology seeks to apply the knowledge of systems in nature to the design and operation of industrial activities, to achieve integrated and sustainable relationships between the natural world and industry. If production and consumption methods in human controlled systems could be made to emulate the efficiencies of natural systems, then greater sustainability would ensue, and a means would emerge of addressing the growing amount of waste produced by industry and a consumption-driven society.

Industrial waste streams are often generated at predetermined rates, in relatively large quantities and of fairly constant composition. Therefore it could be possible for industries to exchange waste, where the waste stream from one industry can become a resource to another. This approach will optimise our use of natural resources, reduce the waste that needs to be managed and contribute to the overall sustainability of human controlled systems.

Waste minimisation means altering consumption patterns in a way that is counter-intuitive for most people. At industrial or factory level, waste minimisation can be considered as good housekeeping. Reducing industrial waste refers to improved efficiencies resulting in increased profit margins and reduced environmental liability while contributing to long-term sustainability.

EXTENDED PRODUCER RESPONSIBILITY

Extended producer responsibility entails producers of consumer products taking responsibility (financially and physically) for the products that they produce at the end of their useful life, i.e. the post-consumer stage. In reality this means that when certain consumer goods become obsolete it should be possible to return them to the manufacturer for re-use, recycling or safe disposal. This regulatory tool could facilitate increased use of recyclable materials in product manufacturing thereby reducing waste going to landfill. Extended producer responsibility is finding its way into waste and consumer protection legislation worldwide.

Manufacturers should therefore proactively seek to increase the useful life of consumer products, increase the recyclable content and put systems in place to deal with their products at the end of their useful life.

RE-USE AND RECYCLING

Viewing waste as a resource that can be used to replace virgin materials during manufacturing processes will lead to the saving of natural resources. Innovation in the recycling industry has already resulted in a number of interesting new consumer products entering the market.

Re-using, recycling and recovering waste is mostly associated with informal pickers and salvagers in developing countries, including South Africa, sorting through waste bins in central business areas or at the landfill. This is a clear indication of the intrinsic value of waste. Unfortunately, the material reclaimed from mixed waste is generally of poor quality and not in economical volumes for recyclers. There is thus a need to improve the quality of the recycled materials and collect it at volumes that are economically attractive to recyclers.

Recycling initiatives associated with schools, churches and other charity organisations are largely driven by the potential for income generation and to a lesser degree by awareness creation and education potential. These initiatives rely on separation of recyclable materials at source (household level) and require that the waste be taken to a drop-off facility at the school, church or charity organisation. The quality of recycled material collected this way is generally clean and of high value. Increased participation in re-use and recycling initiatives are required to reduce our footprint.

“Innovation in the recycling industry has already resulted in a number of interesting new consumer products entering the market.”

Business and large organisations also generate substantial volumes of mostly recyclable materials, including office paper, batteries, printer cartridges, electronic goods and packaging material. Separating this waste at the source of generation and sending it to recycling facilities will significantly reduce its effect on the environment. An even greater reduction in waste will be achieved with a move away from paper-based systems and correspondence.

Dr Suzan Oelofse is a Principal Researcher in Pollution and Waste at the Council for Scientific and Industrial Research of South Africa and Branch Chairperson of the Institute of Waste Management of Southern Africa, Central Branch. She has been working in the pollution and waste management field for the past 15 years.

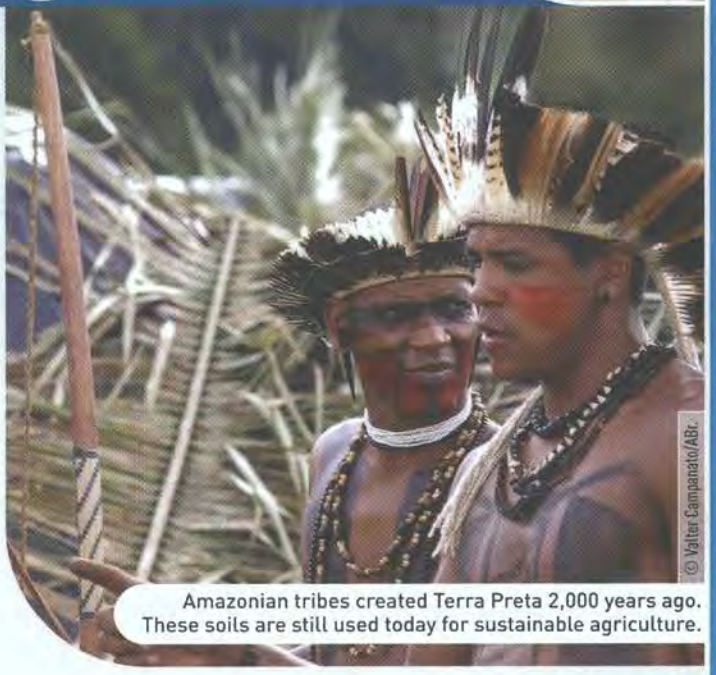
The **Institute of Waste Management of Southern Africa** (IWMSA) is a professional, multidisciplinary organisation with voluntary membership that was established to promote the science and practice of waste management. The IWMSA is committed to protecting the environment and people through sustainable best practical environmental options, by contributing to improving waste management standards and legislation; supporting international, national and regional trends in best environmental practices; promoting the science and technology of waste management; practicing affordable cost effective waste management; and educating and promoting sustainable best environmental options.

IWMSA, Weltevreden Shopping Center
cr. Kanniedood and Rinyani Streets
Weltevreden Park, PO Box 79, Allen's Nek, 1737 South Africa
Tel: 011 675 3462/4 | Fax: 011 675 3465
Email: info@iwmsa.co.za | Web: www.iwmsa.co.za

Biochar use: a productive alternative to carbon storage

By **Bruno Glaser**, Institute of Agricultural and Nutritional Sciences, Martin-Luther University Halle-Wittenberg, Germany

Efforts to control the release of greenhouse gas emissions into the atmosphere have included a number of options for sequestration and storage of carbon dioxide. About 10 per cent of the EU's carbon emissions could be offset by more productive use of biomass and crop residues through pyrolysis. This would provide stable carbon in the form of 'biochar', that could be used as a soil improver, and as a source for other carbon uses such as construction. Since this technology is fully developed, the author argues, it must be added to the armoury of weapons against climate change, and deployed without delay.



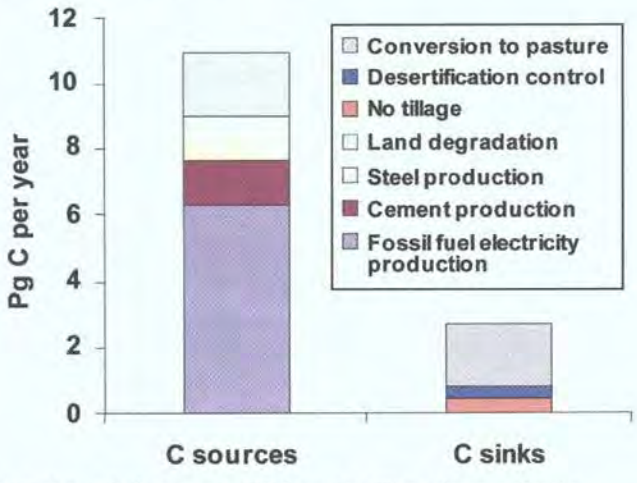
© Valter Campanato/ABr.

Amazonian tribes created Terra Preta 2,000 years ago. These soils are still used today for sustainable agriculture.

Greenhouse gases such as carbon dioxide (CO_2), methane (CH_4) and oxides of nitrogen (especially N_2O) are the basis of human-induced atmospheric pollution. The major human contribution to the global greenhouse effect comes from the emission of unimaginably high quantities of CO_2 into the atmosphere. This corresponds to 11 petagrams of carbon (Pg C a^{-1}, corresponding to Billions tons of C per year), of which about nine are caused by emissions from fossil fuel burning (about 60 per cent for electricity production and transport, and 25 per cent for cement and steel production) and about 2 petagrams by land use – mineralisation of organic matter resulting in soil degradation and desertification (Figure 1). Carbon dioxide is emitted from deforestation, biomass burning, conversion of grassland to agriculture, drainage of wetlands and soil cultivation in general. Due to increasing population growth, greenhouse gas emissions will continue to rise.

In addition, climate change itself will influence terrestrial and marine ecosystems' capacity to act as repositories for CO_2. For instance, soil organic matter mineralisation is expected to increase due to increasing temperature; and the potential of CO_2 storage in the ocean is expected to decrease with increasing temperature, both adding to the greenhouse effect. Therefore, sustainable solutions for the removal (sequestration) of atmospheric CO_2 are needed for global climate change mitigation.

Figure 1. Sources and potential human-made sinks for atmospheric carbon dioxide.



Note: Data in Pg (petagrams, 10^{15} g) equal to billions of tonnes of carbon. Note that conversion into CO_2 data requires multiplication by 3.67.

CARBON SEQUESTRATION

Carbon (C) sequestration is the long-term removal of CO_2 from the atmosphere, long-term implying at least hundreds of years, preferably thousands. Current available agricultural techniques such as conservation tillage, no tillage or desertification control will contribute only little to carbon sequestration into soil (Figure 1). Only conversion of agricultural land into grassland (pasture) could cope at least with agriculturally derived CO_2 emissions; however, this would merely make the present problem worse because of the tremendous loss of energy from the conversion of plant into animal food. Therefore, potential options for C sequestration are:

- Carbon capture and storage (CCS);
- Carbon capture and use (CCU) including C sequestration in soil (biochar), construction materials and infrastructure;

Figure 2. Typical soil profile of humid tropical soil with no biochar exhibiting low SOM levels and low soil fertility (left) due to intensive weathering; and a terra preta with biochar (right) showing exactly the opposite: high SOM and nutrient contents and thus high soil fertility.

- Sequestration of solid carbon in (polluted) ocean sediments;
- Use of carbon as adsorbent (activated carbons) and then disposal of carbon in waste lands (landfills, closed mines, deserts, etc);
- Afforestation;
- C sequestration into algae;
- Silicate weathering.

WHAT IS THE BEST SOLUTION FOR C SEQUESTRATION?

Conventional techniques for climate change mitigation such as biofuels and CCS are 'closed loop', which means that they only sequester emitted CO_2. Therefore, these techniques cannot reduce actual or future CO_2 levels of the atmosphere. In addition, as they are not 100 per cent efficient, both of them will further increase atmospheric CO_2 levels. Capturing CO_2 in stable solid forms (eg. as Biochar) and use for improvement of ecosystem services or in construction materials can actively lower atmospheric CO_2 concentrations while generating economic added value.

THE TERRA PRETA PHENOMENON

There is an impressive example that the biochar concept works. Anthropogenic dark earths or *terra preta de Índio* are 2,000-year-old man-made soils in central Amazonia exhibiting high nutrient and soil organic matter (SOM) stocks which allow sustainable agriculture even today. These soils were made from huge inputs of organic waste materials (kitchen leftovers, excrement, biomass waste) and charred residues (biochar) in the soil, worked on by indigenous soil organisms. In recent years *terra preta* has gained increasing interest because it could act as a model for promoting sustainable agriculture while storing large amounts of carbon from the atmosphere in the ground with additional positive benefits. The terra preta concept has the potential to combine sustainable agriculture with long-term C sequestration.

SOIL IMPROVEMENT WITH BIOCHAR

Biochar is created by thermal decomposition of organic materials for use as a soil amendment. Pyrolysis converts diverse organic molecules into three fractions – one that comprises stable aromatic rings (char) which can be stored as biochar for the long term in soil, and two which can be used for energy generation: a liquid bio-oil and a gas which can be used for synthesis of organic molecules (syngas). Carbon in biochar is considered to reside in stable compounds depleted of hydrogen and oxygen, precluding its subsequent degradation to CO_2 in the environment. Nutrient elements not volatilised at high temperatures are conserved in biochar; being freed from associations with carbon, they may become soluble and readily available to plants.

Because biochar production for agricultural use in the EU is still under development, no protocol or standard has been established yet. This will be an important step to satisfy consumer and policy concerns on biochar safety. Like charcoal, biochar is expected to comprise highly stable molecular forms of carbon. Due to its resistance to biochemical degradation, the potential for biochar creation to sequester carbon into soil in the long term (centuries to millennia) is well appreciated, offering clear potential for use as a tool in climate change mitigation.

> **“Conventional techniques for climate change mitigation such as biofuels and CCS are ‘closed loop’, which means that they only sequester emitted CO_2.”**

Further impacts of biochar on ecosystem services have been measured in isolation or under controlled conditions. These remain incompletely explained or proven in the predictive sense but include effects such as increased plant productivity, improvements of soil pH and cation exchange capacity. Thus biochar use holds promise for the storage of available nutrients, crop nutrient availability, changes in soil water dynamics and soil moisture, soil microbial community structure and abundance, soil structure and architecture, soil organic matter content and its turnover, crop disease mitigation, and impacts on the rate of non-CO_2 greenhouse gas emissions from soil.

Biochar amendments offer the potential for carbon-neutral or carbon-negative food production and development of brand value, together with an income stream from acquisition of CO_2 certificates traded on the voluntary carbon market. The eco region of Kaindorf (Austria) has successfully implemented such a system. In addition, when combined with plant nutrients from waste materials such as from green wastes or slurries, additional benefit arises from saving money for buying mineral fertilisers, and by better control of pollution from slurry application.

BIOCHAR AS A CONSTRUCTION MATERIAL

Carbon fibres are state-of-the-art materials with properties that include light weight, high strength and chemical stability. Carbon composite materials can substitute steel and other metal although they exhibit different properties. To become a useful construction material, the mechanical strength of carbon materials must be comparable to existing steel and concrete materials. Carbon fibres are already used in tensile force-resisting construction material to reinforce concrete for special applications. In addition, carbon-based concretes have been used for decades in construction material resistant to compressive forces. For instance, the lower part of blast furnaces for iron production consists of carbon brick. Composites used for construction materials are already an emerging field, both for new building and for reinforcement of old structures.

"Biochar amendments offer the potential for carbon-neutral or carbon-negative food production."

BIOCHAR PRODUCTION TECHNOLOGIES

From a technology point of view, several companies such as PYREG and German Charcoal GmbH already have well-developed pyrolysis systems to produce Biochar. These systems are capable of handling a range of biomass types including organic waste materials. Furthermore, there are large volumes of readily available biomass to feed the biochar process. What is lacking is the political will to drive the widespread implementation of this ready-to-use technology.

HOW MUCH BIOCHAR CAN WE AFFORD?

Considering Europe and only the residue from grain crops, total dry perennial biomass potential is around 300 megatonnes (Mt). This could be turned into over 80Mt of biochar (not including additional yield from crops such as maize, vine cuttings, sunflowers etc). Given that Europe emits about 1,200Mt of carbon per year, biochar could offset around 10 per cent of Europe's emissions (Table 1). The EU intends to reduce these emissions (basis 2005) by 14 per cent by 2020. However, with the large-scale deployment of biochar, this could be improved to 23 per cent. If implemented on a global scale, biochar could have a much larger impact and go a very long way to slowing or possibly reversing the increase of atmospheric CO_2.

Since biochar is a 'ready to go' tool it should be added to the climate change tool kit of renewables, energy saving and CCS. Furthermore, given that the issue of rising CO_2 levels is an immediate problem, we believe that it is imperative to deploy all the ready tools in the CC tool kit in as prompt and large-scale fashion as possible.

TABLE 1. POSSIBLE BIOCHAR PRODUCTION SCALABILITY ACROSS EUROPE FROM ORGANIC WASTES ALONE

	Mt	
Cereal crop residues	300	
Other (forestry etc)	100	
Viticulture (cuttings)	40	
Household garden waste	35	
Commercial garden waste	20	
Total	**495**	28% biochar yield
Biochar (80% carbon content)	**140**	
	(10%)	
EU carbon emissions	**circa 1,200**	

With ready-to-go technology (eg. PYREG), about 140Mt of biochar can be produced annually, offsetting additionally about 10 per cent of C emissions across Europe.

"It is imperative to deploy all the ready tools in the CC tool kit."

Dr Bruno Glaser is Professor in the Institute of Agricultural and Nutritional Sciences, Soil Biogeochemistry, Martin-Luther University Halle-Wittenberg, Germany.

Martin Luther University Halle-Wittenberg has been a scientific institution for more than 500 years. The department of Soil Biochemistry is part of the Institute of Agricultural and Nutritional Science, which is an interdisciplinary group consisting of soil scientists, chemists, ecologists, biologists, geologists, environmental managers and specialists of isotopes and experimental ecology. Co-operations exist also to the Helmholtz Centre for Environmental Research (UFZ) and other German, European and International institutions dealing with Biochar issues. This consortium aims to understand the dynamics of organic and inorganic compounds in the environment, and the fate of Biochar is a special focus.

Martin-Luther-Universität Halle-Wittenberg
Naturwissenschaftliche Fakultät III
Institut für Agrar- und Ernährungswissenschaften
06099 Halle, Germany
Tel: +49 (0)345 552 2301 or 2302
Fax: +49 (0)345 552 7118
Email: bruno.glaser@landw.uni-halle.de
Web: www.landw.uni-halle.de

EISENMANN

Environment-friendly technologies for green production

There are generally three central concerns when planning an industrial plant: high operating reliability and safety, low investments, and low energy consumption, which impacts positively on operating costs. For the plants planned and implemented for 60 years now by the German company Eisenmann, both energy efficiency and environmental protection are integral components. Heat pumps, cascade technology, recycling air and heat to the production circuit – Eisenmann had already featured these CO_2 saving measures before the term 'green technology' took over the media. Resource-saving production technologies have been added over time to the tried and tested production technologies. What has remained constant is Eisenmann's approach of optimising every plant for resource and CO_2 savings.

Eisenmann is numbered among the internationally leading system suppliers in the sectors of surface engineering, material flow automation and environmental and thermal process engineering. Its customers include vehicle manufacturers and their component suppliers in addition to producers of carbon fibres, chemicals groups, waste recyclers, logistics companies and many more. A workforce of around 3,000 worldwide develops new technologies and plants for production, assembly and distribution.

Eisenmann has a large technology centre in Holzgerlingen, Germany, not far from its company headquarters in Boeblingen near Stuttgart.

MAJOR DEMAND FOR GREEN TECHNOLOGY

Fossil fuels are becoming scarcer and more expensive, and more stringent national targets are fuelling the trend for resource-saving processes. A product is only credibly green for the customer if not only its consumption but also its production process is green. Consequently, Eisenmann engineers are constantly seeking the most sustainable solution for their customers. However, since every Eisenmann plant is unique, the solutions are also diverse. The following sections give some examples.

THE RESOURCE-SAVING PAINT SHOP

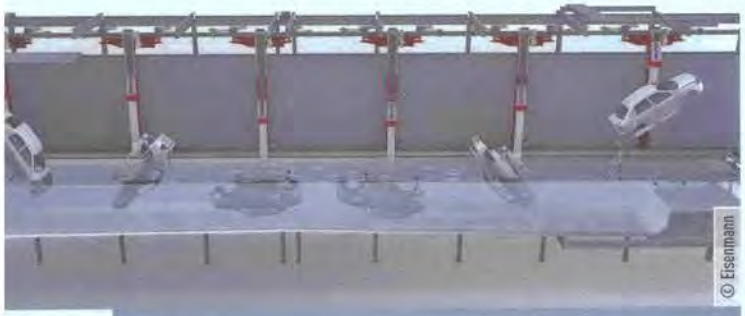
On the automobile, around 12 per cent of CO_2 emissions are caused not on the road but as early as in the paint shop. Body painting is one of the most energy-intensive processes in automobile production. The Fraunhofer Institute for Production Engineering and Automation (IPA) identifies spray painting and drying as the two process steps having the greatest energy and resource consumption. Eisenmann has developed a new technology for the painting booth: E-Scrub. The overspray (the excess paint particles) which occurs when applying the paint is separated off with the aid of an electrostatic system. Only slight traces of particles remain in the exhaust air. This allows the entire energy consumption in the booth to be reduced by up to 75 per cent, and allows water consumption to be cut by almost 86 per cent.

CO_2-OPTIMISED: VW CHATTANOOGA

The new plant of the Volkswagen Group in Chattanooga, Tennessee, USA, is a model of a resource-saving paint shop. The plant was commissioned in May 2011, to manufacture up to 150,000 vehicles per year, such as the Passat, adapted for the US market. Chattanooga is one of the most modern and most environment-friendly automobile plants. Eisenmann, as the prime contractor, supplied the paint shop, in which the intention is to cut carbon dioxide emissions by around 20 per cent and make substantial savings on material and energy. The newly developed E-Shuttle conveyor system is used for the first time in Chattanooga to transport the bodies through the pretreatment zone and cathodic dip coating, consuming less water, chemicals and energy. The further-developed regenerative thermal oxidation system, E-Comb-RTO, with integrated heat exchanger, also fits in optimally in the sustainable production concept of Volkswagen Chattanooga. The exhaust-gas decontamination system

operates so effectively that CO_2, nitrogen, carbon monoxide and carbon emissions are significantly lowered. At the same time, an innovative burner system and highly efficient heat exchangers ensure a greatly reduced gas consumption. However, the greatest energy saving for Volkswagen is from recycling the waste heat back into the process.

The E-Shuttle makes it possible to optimise the quality of pretreatment and cathodic dip coating by sequences of movement adapted individually to the body shape.



The new Volkswagen plant in Chattanooga was constructed on a site covering 560 hectares. It is one of the world's most modern and most environment-friendly automobile plants.

PAINT SHOP MEETS SOLAR HEATING TECHNOLOGY

With the Ritter XL Solar company, Eisenmann has found a strategic partner for a completely new business model: large-scale plants for the paint shop combined with solar heating technology. This method features high CO_2 savings and an economically attractive overall yield. It uses vacuum tube collectors installed on the roof of the production plants. The heat produced by the solar collectors is passed to a hot water storage tank from which the various consumption points are supplied. The energy obtained can also be used to cool specific processes. Using solar heating energy, it is possible to cover between 30 and 50 per cent of the annual process heat demand of a paint shop, and also reduce CO_2 emissions accordingly depending on location and operation.

In Central Europe it is possible to replace up to 32 per cent of conventionally produced energy for pretreatment with a solar heating plant with a size of 3,000 square metres.

WASTE-TO-ENERGY: BIOGAS PLANTS

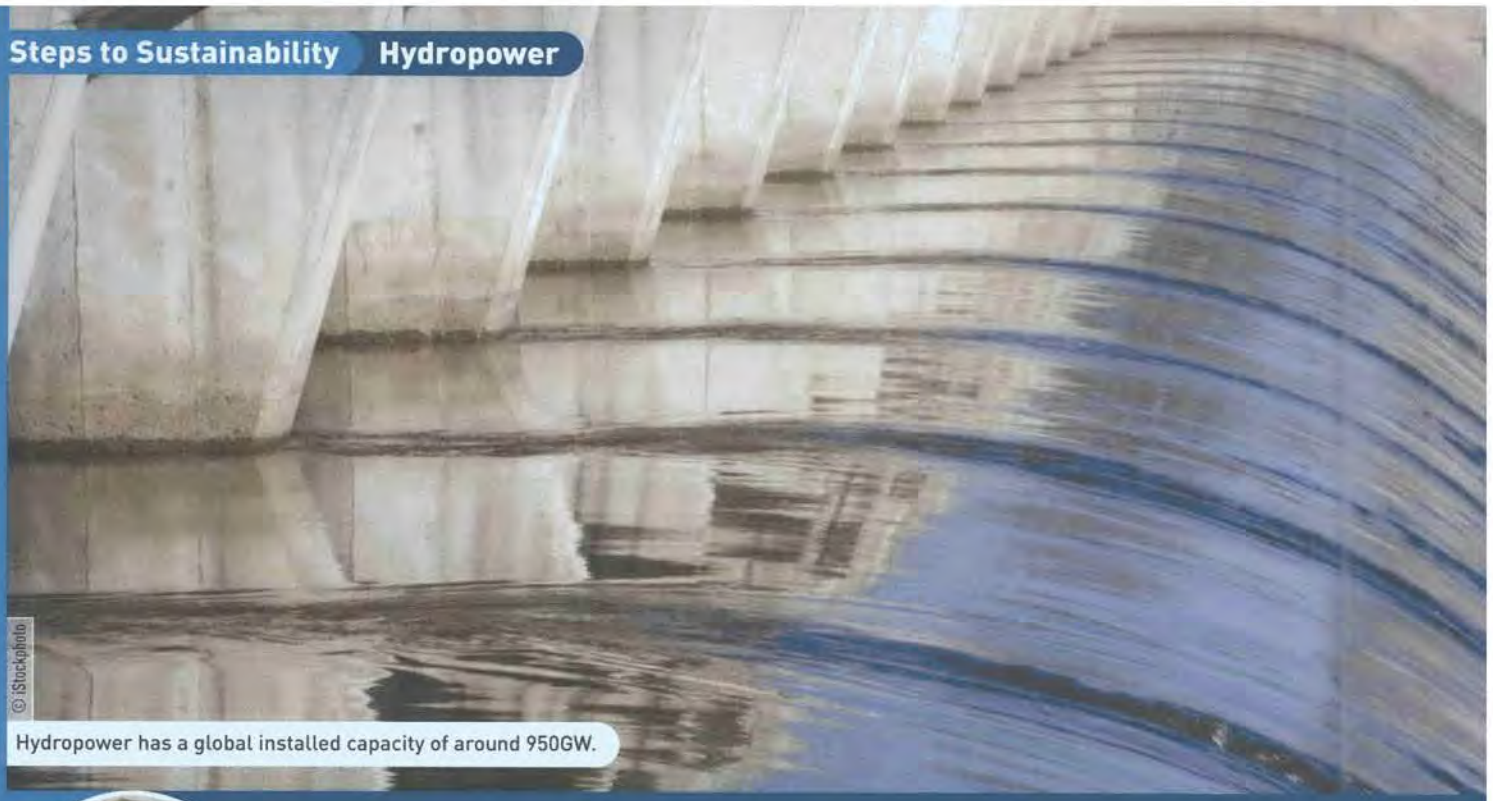
Eisenmann research covers not only how energy can be generated cleanly in large-scale plants, but also how waste can be used for energy production. Garbage as an energy source is nothing new in itself. In Germany, waste cooking fat has been used to produce biodiesel since as early as the 1990s. Eisenmann offers a number of processes for environmentally-friendly disposal of waste, waste gases and waste water for industry but also for energy utilities and municipalities. Eisenmann's Environmental Technology Division has been marketing biogas plants since 2003. Over 90 of these plants are now in operation. By fermenting various substrates – biowaste, grass, bush and tree cuttings, liquid manure or solid manure – the plants produce biogas which is then converted to electrical power and heat. Sustainably-grown raw materials are also suitable as substrates; however, this is increasingly viewed as inappropriate owing to the area it would take up in Europe. Eisenmann also offers its customers a number of special solutions, besides the classic biogas plant.

OXIDATION FURNACES FOR CARBON FIBRE PRODUCTION

What weighs less also consumes less energy, and thus produces less CO_2. Carbon fibre has excellent mechanical properties where it is used as a composite material. But the material of the 21st century has a positive aspect for the CO_2 balance with its low weight. By now, not only have the aerospace industry, motor racing and sports equipment sectors discovered this but also the automobile industry. In electric automobile manufacture, the lightweight material which can compensate for the weight of the battery is a crucial factor for market feasibility. Eisenmann offers a complete production line for manufacturing carbon fibres.

The successful launch into the carbon fibre production sector and the numerous innovative products and solutions from Eisenmann are essentially based on the company's plant engineering expertise and its many years of research and development activities. This, together with a modern technology centre at the German headquarters, allow further development of CO_2-saving engineering for green production.

Eisenmann AG
Tübinger Str. 81, D-71032 Böblingen, Germany
Tel: +49 7031 78 0 | Fax: +49 7031 78 1000



Hydropower has a global installed capacity of around 950GW.

Hydropower and climate change

By **Cameron Ironside**, Programme Director, International Hydropower Association (IHA)

Hydropower already satisfies a significant portion of the world's energy requirements. Its influence will increase in a climate changed world as it not only facilitates adaptation through water storage, but also enables the large-scale integration of renewables into energy systems. Hydropower plays a unique role in advancing global renewable energy systems and has the ability to respond to global energy needs.

Hydropower is a renewable energy source generating electricity through the movement of water from a higher to lower elevation. Its energy conversion rate of 90 per cent is the highest of any known energy source. Hydropower has a global installed capacity of around 950GW – 19 per cent of worldwide installed electricity capacity – and generates approximately 16 per cent of the electricity used worldwide.

This installed capacity represents a small portion of international hydropower potential, especially in the areas where it will be most required in a climate changed world. For example, Africa currently only utilises approximately five per cent of its hydropower potential.

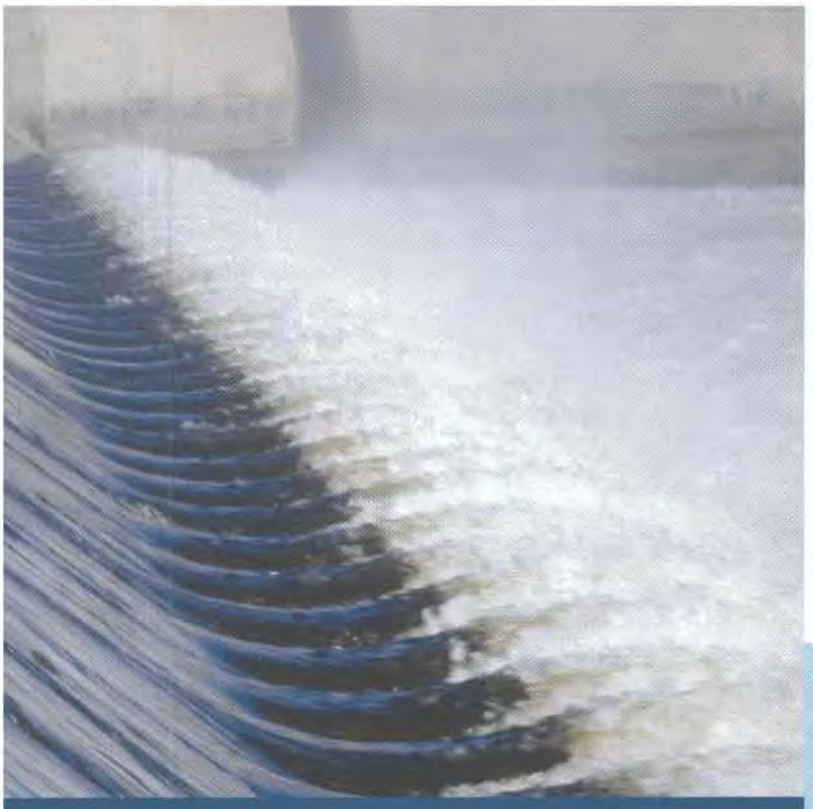
IMPACT OF A CHANGING CLIMATE ON HYDROPOWER

It is clear that changes in climate will impact on hydropower: as different areas go through climatic changes, these changes will impact on the rivers that feed hydrological systems. The changes in river runoff will thus dictate the changes to the availability of hydropower as a resource.

While there are currently no global figures predicting the effects of climate change on the technology, a recent study by Hamadudu and Killingtviet (2010) which analysed the changes to river flows, as predicted by 12 different climate models, to consider the effects globally on existing hydropower, provides some indication: while the results indicate significant changes on a country or regional level, they suggest that the total global change to the hydropower system is small (around 2.5 per cent).

> **“Hydropower has a role to play in both mitigating against and adapting to the effects of climate change.”**

These results match the anecdotal evidence from within the membership of the IHA. While some countries, such as Australia, are already experiencing negative impacts, others such as Norway are anticipating increases in potential. Again, while more detailed studies are required, it is clear that changes will vary by region and will be both positive and negative. Currently, it is thought that the overall impact will be small, and possibly slightly positive.



Pumped storage in action.

HYDROPOWER SUSTAINABILITY ASSESSMENT PROTOCOL

If sustainability aspects are not taken into consideration, construction and operation of hydropower dams can have significant environmental (e.g. adverse impacts on natural river systems and quality and security of drinking water, wetland destruction) and social impacts (e.g. forced displacements, adverse effects on of agricultural and fishing activities).

Reflecting the recognition of its increasingly important role, the hydropower industry has worked with concerned stakeholders and partners over the past three years to develop the Hydropower Sustainability Assessment Protocol. The Protocol is an enhanced sustainability assessment tool which is being used to measure and guide performance in the hydropower sector.

It assesses the four main stages of hydropower development: Early Stage, Preparation, Implementation and Operation. Assessments rely on objective evidence to create a sustainability profile against some 20 topics depending on the relevant stage, and covering all aspects of sustainability. The development process of the Protocol involved field trials in 13 different countries and stakeholder engagement with 1,933 individuals in 28 countries.

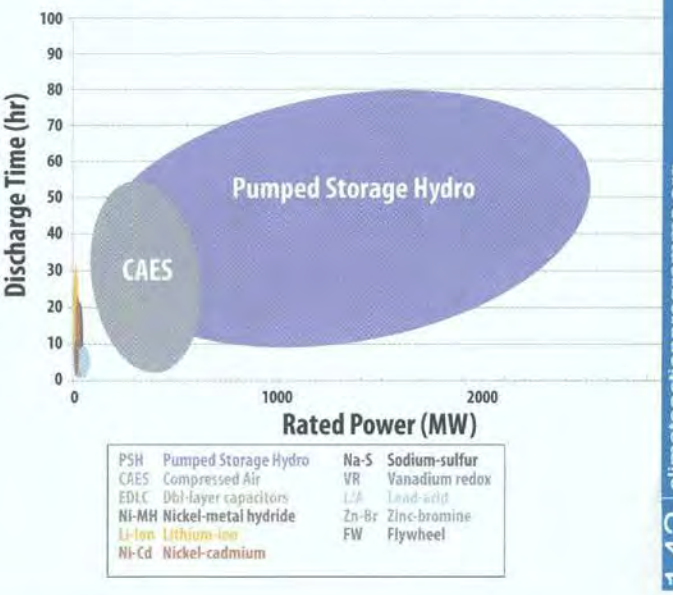
HYDROPOWER'S ROLE IN A CLIMATE CHANGED WORLD

Hydropower has a role to play in both mitigating against and adapting to the effects of climate change.

The UN Climate Change Conference in Cancún provided an acknowledgement that adaptation must be addressed with the same priority as mitigation with the establishment of the Cancún Adaptation Framework. A central pillar of adaptation is water, and within the negotiations there was recognition of the need to better manage water, most importantly the need for storage to ensure flexibility and address supply issues. Hydropower has a key role to play in developing this capacity. It is one of the few users of stored water able to provide substantial revenue streams that can fund the required infrastructure. As the variability of water supply increases and demands further storage and management, hydropower provides a means both of supplying clean renewable energy, and funding infrastructure development.

In mitigating against the impacts of climate change, hydropower plays a role both as a renewable energy in its own right, and as an enabler of other renewable technologies. It provides a large portion of the current mix of renewable energy, representing around 80 per cent of currently installed renewable capacity, and as it has been used for over 100 years is considered technologically advanced. In the form of dams, it provides numerous ancillary benefits such as storage (as mentioned above), flood control, irrigation and recreation. Hydropower offers both base load provision, for example through large run of river

Storage showing actual capacity on a normal scale.



and storage projects, and peaking capacity through its ability to store energy for use in times of need.

HYDROPOWER AS AN ENABLER OF OTHER RENEWABLE ENERGIES

Hydropower is unique in the role that it can play as an enabler of other renewable energies. As these other renewables expand their penetration of grids across the world, it is becoming apparent that the characteristics of, for example wind or solar generation, are altering the way that energy supply systems operate. As renewables come to dominate grids, the grid no longer functions to meet immediate demand in its entirety from the firm power capacity inherent in thermal base load systems. Rather, supply comes from resources currently available, with any shortfall made up by deploying alternative energy sources, or by utilising energy stored in the grid for this purpose. This is as a result of the ability of these renewables to provide base load juxtaposed with intermittency issues inherent in the technologies.

These new systems require large amounts of stored energy that can be released during shortfalls in other renewable generation, and that can be replenished when there is excess energy in the system. The use of traditional thermal energy sources (such as coal or nuclear) in this role would, due to their nature, lead to the perverse outcome that more thermal systems would have to be built to serve the intermittency issues resulting from wind, solar and ocean energy, and would lead to an increase in emissions (these thermal energies cannot be started up merely to meet short-term shortfalls, but must be run continuously, and have long start-up periods).

Hydropower is currently the only energy source able to both store energy (in the form of water) until it is needed, and to replenish these storage sources in times of excess availability in large enough volumes to act as energy storage facilities for renewable energy systems. Pumped storage facilities are able to both generate electricity and serve as pumps: they pump water to a higher reservoir when there is excess electricity in the grid, and release this stored energy on demand.

Besides the storage benefits that allow hydropower to act as a catalyst for large scale integration of renewables, it also offers a number of ancillary benefits such as frequency and voltage regulation, and black start capabilities; benefits that increase in importance as grids become more renewable.

The traditional role of hydropower as a provider of base load energy remains, and is increasing as its role as renewable energy gains prominence. However, it is the role that it can play in a climate changed world that makes it unique, whether as a source of both energy and finance within the adaptation framework, or, as the world continues to mitigate against further climate change, its role as an enabler for large scale integration of other renewable energies.

A SYSTEMS APPROACH NEEDED

The ability of the available suit of renewable energies to harness the naturally available resources and convert them into clean energy is their major attraction in combating further climate change.

However, this ability also means that they are reliant on these resources (the wind, sun and tide, for example) which are themselves inherently intermittent.

As incentives such as feed in tariffs are put in place, and large sums of money are focussed (for example, under the Climate Investment Funds) on renewable energies, it is vital that a systems approach to this financing is taken, to ensure that perverse outcomes are avoided. If the focus remains on incentivising individual renewable technologies without considering the systems required to support them (for example, required changes to the grid, or storage requirements), and the incentives do not operate at a large enough scale (so that they can in fact have system impacts) perverse outcomes will result, primarily the need to build or maintain in use thermal generation, to provide the required back-up or 'storage' to these renewables.

> **"System changes require appropriate incentive models and scale to be effective."**

This is especially the case in developing countries, where the change required is a substantial increase in capacity, rather than just changing the generation source or type. If the systems are not designed now to support the large scale integration of renewables, these developing countries will be forced to add more thermal power to systems, irrespective of increases in renewable capacity – and as these will be new plants, this option will lock in carbon intensity, rather than providing a solution to the problem. Financing and incentives need to account for this.

Cameron Ironside joined IHA in February 2010 following a recently completed MBA at the University of Edinburgh. Prior to his MBA Cameron was a successful practising lawyer in South Africa for 10 years prior to relocating to the UK. Cameron currently leads the IHA programme activities, and is responsible for implementing the Hydropower Sustainability Assessment Protocol.

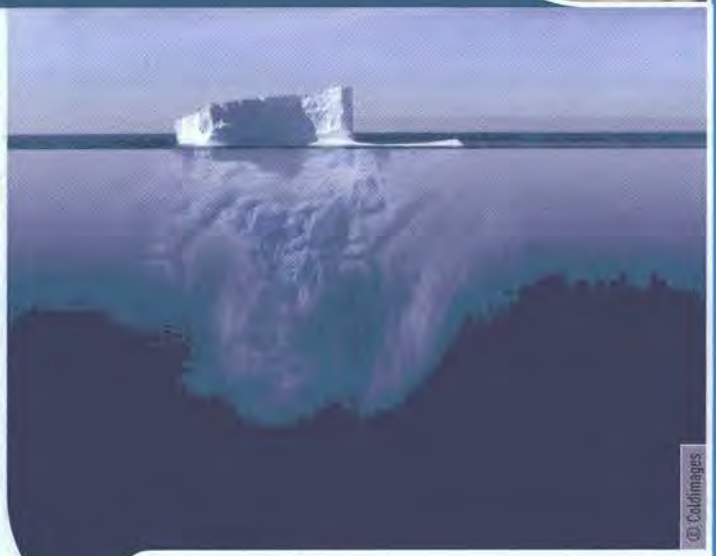
The **International Hydropower Association** (IHA) was formed under the auspices of UNESCO in 1995 and is an international member-based organisation with the mission of advancing sustainable hydropower. IHA has members active in over 80 countries and provides a forum to promote and disseminate good practice and further knowledge about hydropower. IHA has a Central Office based in London and a representative office in South America. In addition, IHA currently has consultative and/or observer status with all UN agencies addressing water, energy and climate change.

Cameron Ironside, Programme Director
International Hydropower Association
9 Sutton Court Road, Sutton, SM1 4SZ, UK
Tel: +44 (0)20 8652 5220 | Fax: +44 (0)20 8643 5600
Email: ci@hydropower.org | Web: www.hydropower.org

Assessing the supply chain for efficient production, cost and reputation

By **Frances Way**, Programme Director at the Carbon Disclosure Project (CDP)

It makes good business sense to assess the supply chain for efficient production, cost and reputation. When this is done with an awareness of climate change impacts, it can uncover opportunities companies can capitalise on. A value chain approach is required and for this to be successful procurement teams and suppliers must be educated in the risks that climate change presents. Efficient use of energy in the supply chain can reduce operating costs. Measurement is key to driving efficiency; it not only provides a baseline but improves understanding and highlights opportunities for improvement. Supplier performance management should include greenhouse gas (GHG) emissions management, and this can be facilitated by scoring and benchmarking. Relationships between buyer and supplier have to be transparent and collaborative; your suppliers may hold the solutions.



Like the bulk of the iceberg, much of your climate change risk could be below the surface in your supply chain.

In order to avoid catastrophic climate change and respond to the challenge of increasingly scarce natural resources, we need to decouple economic growth from GHG emissions and move to a low carbon economy. Companies will be required to make both strategic and operational adjustments throughout their value chain by focusing on efficiency, transparency and performance management. It will be challenging but this is a predictable industrial revolution with significant opportunities that companies can plan to capitalise on. The management tools they require follow the same principles as those already used to assess efficient production, cost and reputation.

THE VALUE CHAIN APPROACH

A value chain approach to carbon management considers the impacts from production to consumption of a company's products. Increasingly companies look beyond the invoice price of materials to consider the total acquisition costs associated with how the materials are handled, stored and disposed of. Taking a value chain approach to climate change impacts includes assessing the packaging, transport and processing of the materials. Volatile energy prices have motivated companies to focus on the energy use of their suppliers, and the energy efficiency of the products they provide to consumers. Imperial Tobacco Group in 2011 began to turn to suppliers' Carbon Disclosure Project (CDP) reporting history to check their energy use and climate risk management, before granting price increases due to energy costs.

Procurement professionals also need to think about the cost of stock shortages and whether changes in weather patterns and extreme weather events are likely to disrupt supply chains.

> **"We need to decouple economic growth from GHG emissions and move to a low carbon economy."**

Devastating floods in Pakistan led to soaring cotton prices at the end of 2010, which impacted the operating margin for Primark and the share price of its parent company Associated British Foods. The exposure of child labour issues in apparel supply chains revealed that consumers expect companies to look after their whole value chain – and failure to do this can have a serious impact on their reputation.

EDUCATE AND SHARE KNOWLEDGE

Climate change and carbon management may be familiar terms but the details around their impacts are not common discussion topics for buyers and suppliers. Internal training workshops for procurement professionals and supplier summits are effective forums for raising awareness, sharing knowledge and motivating individuals to drive action. In 2010 Bank of America held a two day global supply chain conference, 'Partnering for a Sustainable Future'. It was attended by Bank of America employees and about 400 representatives from 100 suppliers.

YOU CAN'T MANAGE WHAT YOU DON'T MEASURE

Through the CDP Supply Chain programme, 50 large companies around the world collect information from thousands of their suppliers in a single format on GHG emissions, targets to reduce emissions, and activities undertaken to meet those targets. Gathering information in a standardised format reduces the number of requests suppliers receive and enables comparable results and benchmarking. Asking suppliers to report on GHG emissions management is the first step towards an understanding of their emissions sources, and sets a baseline against which to track improvement. Suppliers reporting to CDP demonstrated an improvement in reporting capability in 2010, with about 80 per cent of suppliers reporting emissions compared with about 60 per cent the previous year.

The CDP process increases knowledge and information sharing. Its questionnaire goes beyond the quantitative to include information on the risks and opportunities from climate change. This information drives strategic thinking about business impacts and should form the basis of discussions with strategic suppliers.

EFFICIENCY

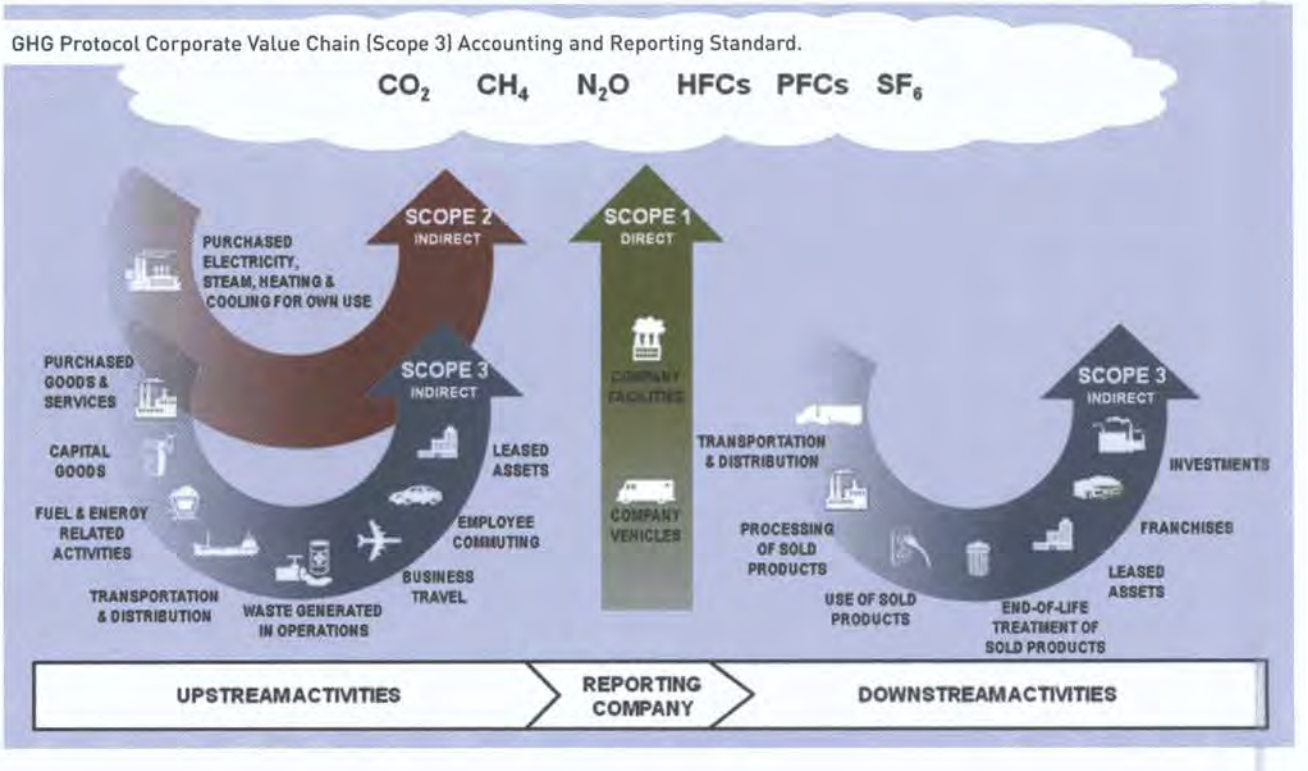
Driving energy efficiency and the reduction of GHG emissions in the supply chain is in line with lean thinking. 'Lean' centres on preserving value for the consumer, while eliminating waste from the production system; GHG emissions are another type of waste that adds no value. A company that can measure and reduce the energy in its supply chain can increase the efficiency of its production and lower costs.

Walmart announced a goal in 2010 to reduce the GHG emissions in its supply chain by 20 million tons of equivalent carbon dioxide by 2015. Its aim is to improve the sustainability performance of the products it already sells. Walmart believes these goals will not only benefit the environment, but also help customers save money on energy bills, reduce supplier costs and lower the costs of goods, supporting the 'everyday low prices' commitment to customers.

Companies are realising that if they can uncover energy saving opportunities in their operations, it is likely their suppliers can too. PepsiCo uncovered more than US$60 million in energy saving opportunities across its beverage plants using its energy assessment tool, and has achieved a 16 per cent reduction in per-unit energy use. It now provides its strategic suppliers with a three-day training course and access to its assessment tool, which highlights a supplier's top 10 to 15 energy conservation opportunities.

Transparency in the supply chain is a requirement for efficient production, cost control and reputation. Procurement negotiations have increasingly become more open, based on trust and cost transparency, with the concept of open book accounting. The aim of open book accounting is that if the buying and supplier organisations share process cost information they are able to identify waste in the supply chain, increasing the value of the end product while maintaining all partners' margins. The full carbon footprint of a company includes everything it buys and everything it sells as well as its own operations. In order to understand the footprint, companies need transparent data from their suppliers so that they can work together collaboratively to reduce it. Vodafone aims to develop joint CO_2 reduction strategies with suppliers accounting for 50 per cent of procurement spend by March 2012.

GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.



BENCHMARKING PERFORMANCE

Comparing one supplier's carbon reporting to another can be like comparing oranges with apples. CDP disclosures are analysed and scored for their quality and completeness. The company's performance in contributing to climate change mitigation, adaptation and transparency is assessed and ranked. Providing scores for benchmarking to procurement teams empowers them to continue the discussion with suppliers on areas for improvement. It is also a quick way to highlight the leaders and identify best practice to share among the supplier base.

IDENTIFYING OPPORTUNITIES FOR COLLABORATION

Climate change cannot be solved by an individual company in isolation. Suppliers often have suggestions on how their customer can reduce emissions and providing opportunities for suppliers to put forward these suggestions is the first step to innovation in the value chain. For the first time this year CDP asked companies' suppliers to make specific proposals to their customers for collaborative development of GHG emission reduction projects. To protect commercially sensitive information and ensure data is received in one place, it is advisable to provide suppliers with access to a secure web-based portal. Online systems allow companies to see if and when suppliers have submitted information and provide access to that information as soon as it has been submitted. Guidance and training materials can be made available in the same system to support the supplier through their reporting.

Companies that fail to address climate change risks in their supply chain are ultimately ignoring best practice in supply chain management. Supply chains are interlinked and, like a balloon, if you squeeze them in one place, problems are likely to pop out further down. Real solutions require a holistic approach to the entire value chain and an understanding of potential implications for the company, its suppliers and its consumers. Companies that do not attempt to drive efficiency throughout their supply chain will not provide the best value to the end customer and will fail to gain competitive advantage in their market. In the future, regulations such as carbon taxes and emissions trading schemes are likely to impact the operating costs of suppliers unless they are able to measure and reduce their emissions.

Corporations are migrating to a low-carbon economy by setting a course built on strong leadership and focused collaboration

“Online systems allow companies to see if and when suppliers have submitted information.”

Preparing suppliers for this now by benchmarking their performance and providing feedback on what is expected of them will help to position them as business partners of the future. Real success is dependent on a collaborative and trusting relationship with suppliers that encourages transparency so that solutions can be built on evidence and insights.

PERFORMANCE MANAGEMENT WITH THE BALANCED SCORECARD

The Balanced Scorecard is an established management tool which incorporates non-financial information such as high quality products, motivated and skilled employees, responsive and predictable processes and loyal customers, into performance measurement systems. A number of the companies that CDP works with use balanced scorecards for suppliers that include CDP data points. Dell, for instance, has a supplier scorecard that includes cost, quality, delivery, a technology rating and GHG emissions management. Primary suppliers are asked to report emissions impacts to CDP, establish public goals for reducing their operational GHG impacts, and that they compel their own suppliers to manage and publicly disclose their emissions impacts. Dell's suppliers were told that not meeting these expectations could diminish their ability to compete for Dell's business.

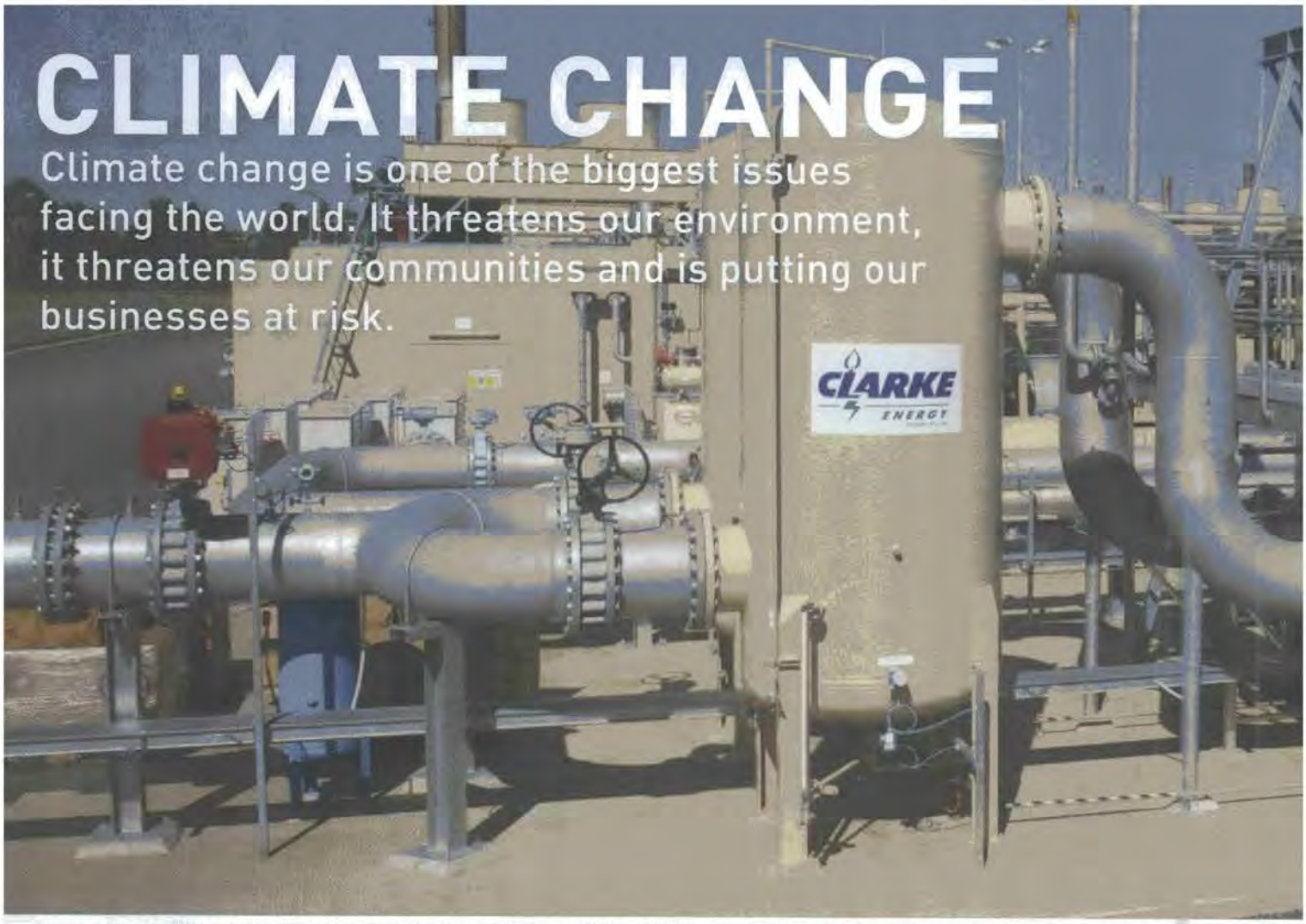
Frances Way is Programme Director of CDP. She joined CDP in December 2007 to manage and expand the Supply Chain Programme. In her role as Programme Director, Frances oversees the delivery of Investor CDP, CDP Supply Chain, CDP Water Disclosure and CDP Reporter Services. Before joining CDP, Frances spent eight years in the finance sector, primarily in Dresdner Kleinwort's Global Equities Division. Frances has an MSc in Environmental Technology from Imperial College, London.

The **Carbon Disclosure Project** (CDP) Supply Chain programme works with 50 multinational companies including Walmart, Dell and PepsiCo. In 2011 CDP collected climate change and emissions data from over 1,800 suppliers.

Carbon Disclosure Project Headquarters
40 Bowling Green Lane, London, EC1R 0NE, UK
Tel: +44 (0)20 7970 5660
Web: www.cdproject.net

CLIMATE CHANGE

Climate change is one of the biggest issues facing the world. It threatens our environment, it threatens our communities and is putting our businesses at risk.



Energy and Technology - An overview of Moranbah North Power Station which is a 77MW power plant located in Central Queensland at Anglo American's Moranbah Development (EDL), and began operations in late 2008 - 26 October 2010

Anglo American is well aware of the harm that could be done, and also of the responsibility we have to take action. We are one of the world's largest mining companies, a major coal producer and consumer of energy.

We have a long term commitment to protecting the environment, we consistently promote sustainability in the communities in which we operate. And in the past five years, we have spent well over 1 billion Rand (US$150 million) in responding to climate change through investment in, for example, CO_2 storage and methane emission projects in Australia and South Africa and biomass projects in Brazil.

It is the right thing to do. But it also makes good business sense. We cannot build a sustainable company without sustainable communities living in secure environments.

Anglo American's CEO Cynthia Carroll, says: "We invest for the long term. So we need to work with local communities, with governments and other stakeholders to address the causes of climate change and protect against its potential impacts. We can't do this on our own."

So what are we doing? We are focusing on three areas: operational excellence, technological development, and partnerships.

Operational excellence

First of all we have to get our own house in order. It's common sense. The less energy we use, the lower our costs - and the better our environmental performance. But you can't manage what you can't measure, so it is vital for us to know what energy we are using in order to help us to use less. Therefore we have developed an energy and carbon management 'tool' called ECO2MAN. This helps us to track our energy use across all of our operations, and enables us to set measurable targets for improvement.

According to Samantha Hoe-Richardson, Anglo American's Head of Sustainable Development and Energy: "ECO2MAN will help us to understand what our priorities need to be at both Group and local levels, so that we can find the most cost effective ways of improving our energy efficiency and switching to lower carbon sources."

Technology

There can be no quick fix for climate change. Technology has an important role to play and Anglo American has been involved – and is investing in – many projects that seek to reduce greenhouse gas emissions.

Today, coal is an important part of the energy mix and it will continue to drive the economic progress of much of the developing world – and several parts of the developed world – for the foreseeable future. The challenge is to make it cleaner. We are part of industry-wide research into a number of vital, complex – and as yet not commercially viable – carbon sequestration technologies that could significantly reduce coal's carbon footprint.

Anglo American is also actively investigating how our commodities can enable and support the transition to a low-carbon society – for example through the increasing use of platinum-based fuel cells in the generation of electricity.

Anglo American is a leading shareholder in MBD Energy which has developed technologies for the commercial farming of algae. Our investment has enabled the development of cutting-edge carbon dioxide (CO_2) sequestration technology which uses waste CO_2 as the primary feedstock, to produce carbon neutral oil and animal feed.

In late 2008, our metallurgical coal operations in Australia commissioned coal-seam methane-fired power stations at Moranbah

AngloAmerican

North mine. The plant generates electricity from methane-rich gas that is released during underground mining operations. The plant is owned and operated by Energy

North and Capcoal in Queensland. These facilities currently generate a combined 77 MW of power, and provide CO_2 emissions savings equivalent to the planting of 3.6 million trees, or taking 580,000 cars off the road.

At our New Denmark colliery in South Africa, we have developed a mobile methane gas flaring project that is now improving safety and reducing our carbon footprint. This world-first project, which costs R9 million (US$1.3 million), will reduce the mine's annual methane emissions by 15%.

Partnerships

There's no single answer to the issue of climate change, and it won't be solved by the actions of one company or one country.

It is a complicated, global issue that has to be tackled on a global basis. This can only be done through partnership, and Anglo American works with national and local governments, with NGOs, suppliers and with the broader mining industry and with local people, to do what it can.

We are, for example, working with some of the world's leading research institutions to develop climate change models for the regions where we operate. These will enable us to adapt our business and to help the communities we operate in to do the same. This work includes projects looking at rainfall in Brazil and South Africa.

Anglo American can do a lot. And it will.

But operating where we do, we know that there are often significant differences in the social and economic development of countries. We believe that the global community needs to take this into account if climate change policies are to be effective and equitable.

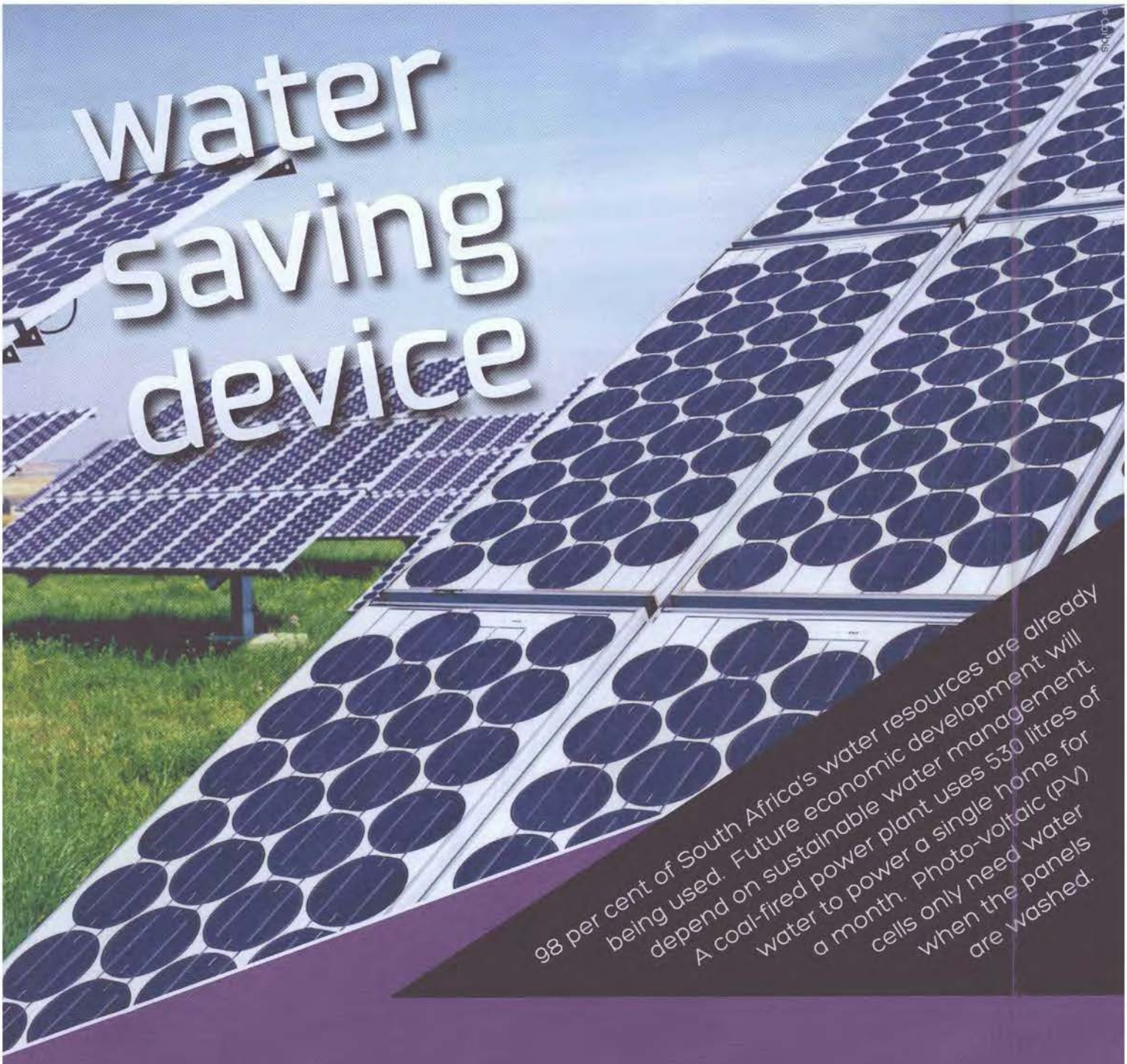
As a major part of the South African way of life for 94 years, we are particularly committed to this country's future development and prosperity.

For example, we are working with the South African Department of Science and Technology to develop a market and local manufacturing of fuel cells which create jobs and reduce reliance on fossil fuels.

Our Platinum business has launched a R100 million (US$13.7 million) fund to invest in platinum-based technology companies in South Africa.

Godfrey Gomwe, executive director of Anglo American South Africa says: "Anglo American strives to work in partnership with the South African government. Through collaboration, we can create a unified framework surrounding climate change, and cultivate workable and effective sustainable development policies. We are committed to playing our part in COP17 as we recognise its importance in tackling one of the defining challenges of our era."

www.angloamerican.co.za



water saving device

98 per cent of South Africa's water resources are already being used. Future economic development will depend on sustainable water management. A coal-fired power plant uses 530 litres of water to power a single home for a month. Photo-voltaic (PV) cells only need water when the panels are washed.

renewable energies, like **PV solar power**, not only combat climate change but can also conserve scarce water supplies in dry countries like South Africa, by replacing coal, oil and nuclear power plants that need water for cooling

www.unep.org

UNEP

GREEN ECONOMY: POWERING CLIMATE SOLUTIONS

154
Building better, greener societies for the planet and the economy
Jane Henley
World Green Building Council

158
Cities catalysing global climate action
Yunus Arikan
ICLEI – Local Governments for Sustainability

CITIES OF THE FUTURE

169
Sustainable low carbon tranport: a weapon against climate change
Michael Replogle
Ramon Cruz
Institute for Transportation and Development Policy

164
Buildings count for climate: a developing country sector response
Dr Rodney Milford
Construction Industry Development Board

174
Sustainable energy efficiency in building
Curt Garrigan
UNEP Sustainable Buildings and Climate Initiative

Autodesk

The role of modelling for sustainable cities

Cities, where the majority of people now choose to live, have become antiquated structures bursting at the seams and subject to some of the worst effects of climate change. Yet advances in conceptual urban planning design and building information modelling (BIM) now enable urban planners to model multiple scenarios, so that they can assess the resilience of various plans to the three-pronged challenge of changes in resource availability and demand, a changing climate, and demographic shifts.

UNPRECEDENTED URBANISATION

For the first time in human history, over 50 per cent of people live in cities (UN Population Fund, 2007) and, by all accounts, this percentage will only continue to grow. From an urban population of one billion in 1960, it took 25 years to add the second billion and only 18 to add the third. And if projections prove correct, the fourth billion will take just 15 years. This trend is being driven primarily by India and China. Never before in history have two of the most populous countries urbanised at the same time, and at such a pace. According to Dobbs and Sankhe in *McKinsey Quarterly* (2011), between 2005 and 2025, India will need to add roughly 800 million square metres of floor space and 400 km of metropolitan rail annually. In that same time period, China will need to add 1,800 million square metres of floor space and 1,000 km of urban rail.

CLIMATE CHANGE FRONT LINE

According to World Bank research, cities account for up to 80 per cent of the expected US$80–100 billion per year in climate change adaptation costs. But the necessary adaptive measures will not be straightforward, because the combined impacts of urbanisation and climate change are not straightforward. For example, one 2011 study by Felix Eigenbrod and others, in Britain, estimates that denser populations will reduce natural water drainage, swelling rivers that are within flooding distance of millions of urban dwellers. But from the other point of view, these denser populations leave more space for agricultural production and carbon storage, essential infrastructure for any hungry and energy-intensive city.

ANTIQUATED INFRASTRUCTURE

The Organisation for Economic Co-operation and Development (OECD) estimated in 2007 that about US$71 trillion, or about 3.5 per cent of the global GDP, will have to be invested by 2030 in order to improve the basic infrastructure worldwide – including road, rail,

Near photo-realistic rendering of a city model with conceptual design for a bridge and waterfront park. Designed and rendered in Autodesk® 3ds Max design software.

telecoms, electricity, and water infrastructure. Most countries plan on spending far less than this amount.

For example, US cities struggle with the dual challenges of water consumption and water quality. According to the American Water Works Association, most water infrastructure in the USA was installed in the late 1800s, the 1920s, or just after World War II. Since then, water use has increased dramatically, and pressure has built inside old pipes. Hotter average temperatures dry the soil, causing it to shrink away from the pipes, allowing them to burst. In cities located far from renewable water supplies, water must be transported over distances, which leads to more leaks. The Mayor of Houston, Texas, recently initiated water rationing because leakage rose from 200 leaks per day to 700 per day this summer. Compounding this challenge of water availability and waste is the issue of quality. Our cities have grown so much since their water infrastructures were built that there are far more impervious surfaces, leading to more stormwater runoff and surface pollution. This growth – combined with trace pharmaceuticals now found in our water from human and livestock sources – overtaxes outdated treatment systems.

THE TOOLS AT HAND

A truly sustainable city is one that integrates with its regional environmental context; is dominated by resource-efficient buildings; prioritises redevelopment, urban infill, and multimodal transit-oriented development; creates minimal water pollution and solid waste; makes affordable clean energy available through efficient siting and distribution; and provides a high quality of life with security for all its citizens.

But, to respond to the three-pronged challenge mentioned in the first paragraph and adapt existing cities – and plan future cities – to fit this description, urban planners and regional government bodies must juggle multiple factors:

- Plan for future growth to support rapid urbanisation of our global population;
- Repair and revitalise decaying infrastructure and urban environments;
- Prepare for and help mitigate the potential risks of climate change.

To that end, more than eight years ago the United Nations University and Institute of Advanced Studies recommended that city planners take advantage of the increased availability of environmental data, including geographic information system (GIS) maps, combined with highly developed simulation tools.

Fortuitously, those tools have come a long way in the past decade. As outlined in *Environment Industry Magazine*, Aug/Sept 2011, "We now have the ability to visualise complex urban systems on a computer before these systems are constructed; and we can optimise them, not only for construction efficiency but for subsequent operations to continue to advance. The application of modelling to entire segments of urban areas enables us to visualise the construction of multiple complex horizontal and vertical

Color-coded city model showing how Autodesk® Infrastructure Modeler 2012 software can be used to theme existing GIS data.

systems in real-time 3D, project this into the future (4D), and incorporate multiple levels of information and data, including financial implications (5D)."

BIM is an intelligent model-based process that provides insight for creating and managing projects faster, more economically, and with less environmental impact, throughout each of the four phases in urban planning and infrastructure design:

- **Plan** more confidently by evaluating existing conditions and communicating the potential impact of projects;
- **Design** and document more productively, streamlining time-consuming design tasks with specific tools and configurable standards;
- **Build** more reliably by helping to identify costly design and scheduling conflicts before breaking ground;
- **Manage** infrastructure more dependably with intelligent industry models to help enforce data quality standards and support future decision-making.

Indeed, a team of researchers at University of California, Berkeley, are using such tools to design a similar quilt of green spaces starting with publicly owned abandoned urban sites.

THE URBAN ECOLOGIST

Investing in training and technology to drive sustainable cities creates sustainable job growth. US employment in the profession of urban and regional planning is projected to grow faster than other professions, according to the US Bureau of Labor Statistics. We should particularly reward those who manage to combine the theory of smart growth and policy design with the experience in geographic information system (GIS) and BIM tools – perhaps from one of a new crop of Master's programs in Sustainable Urban Planning.

After all, it is the 25-year-old urban ecologist upon whom we pin our hopes for future-proofing our cities.

Dr Emma Stewart
Senior Industry Manager, Sustainability, Autodesk
Autodesk, Inc., 111 McInnis Parkway, San Rafael, CA 94903, USA
Web: http://usa.autodesk.com

© WorldGBC

Building better, green planet and the econo

By **Jane Henley**, Chief Executive Officer, World Green Building Council (WorldGBC)

The supersized footprint that the building sector leaves on the environment and the climate is difficult to ignore. UNEP, the International Energy Agency (IEA) and others estimate that buildings consume between 30 and 40 per cent of global energy, and are responsible for about one-third of global greenhouse gas emissions. In some developed nations, these numbers are even higher. In the United Kingdom, buildings are responsible for over 50 per cent of energy use, while the United States can attribute a whopping 39 per cent of its CO_2 emissions to activity in the building sector. What's more, the building sector consumes around three billion tonnes of raw materials annually, roughly 40-50 per cent of global resource consumption. The built environment is also responsible for around 20 per cent of the world's water consumption. And yet, hidden beneath the building sector's alarming statistics lie real opportunities for dramatic improvement.

The Intergovernmental Panel on Climate Change (IPCC) has concluded that buildings hold the largest potential to reduce emissions across all other global economic sectors, and at all cost levels. In fact, through implementation of off-the-shelf energy efficiency measures and technologies, we can begin reducing emissions in residential and commercial building sectors now and achieve cuts in the range of 30 per cent below business-as-usual by 2020, at no net cost.

THE NEED FOR URGENT ACTION

Science tells us that we must keep global temperatures from rising more than the 2°C threshold. But the pledges made by governments to reduce emissions in Copenhagen won't get us there. Governments and businesses in wealthy nations should begin turning to 'green', low-carbon buildings as critical complementary measures to achieve deeper cuts. At the same time, growing economies should employ green building strategies as a central part of sustainable development pathways and efficient energy use.

In particular, cities play an increasingly important role in the transition to a sustainable built environment and a

Los Silos project in Mexico.

"Growing economies should employ green building strategies as a central part of sustainable development pathways."

er societies for the my

green economy. Impacts of buildings on the environment are compounded in urban environments, which is why strategies that address buildings in concert with transport and land-use planning will maximise climate protection.

"Strategies that address buildings in concert with transport and land-use planning will maximise climate protection."

In areas subject to urbanisation and sprawl, sustainability strategies also have the potential to incorporate important priorities for social well-being such as human health, access to basic services, and reducing housing and transport costs. That is part of the reason behind the theme of this year's WorldGBC Government Leadership Awards, 'Local Excellence in Green Building Policy', which will recognise one city for its transformative green building policy during the climate talks in Durban as part of COP 17.

BUILDING THE GREEN ECONOMY

Not only can the global built environment deliver rapid reductions in energy consumption and emissions, but it can do so in cost-effective ways – with a significant percentage realising positive returns to the global economy. Low carbon, sustainable buildings and communities can play an integral role in creating green jobs and rebuilding economies still struggling in the wake of the global financial crisis.

Green building policies have the potential to support massive job growth. UNEP has found that investments in energy efficiency measures in buildings could generate 3.5 million green jobs in Europe and the USA alone. The Natural Resources Defence Council has calculated that five direct jobs and five indirect jobs could be created for every US$1 million invested in energy efficiency retrofits in the US, and similar job numbers support large-scale retrofit efforts in Australia and the UK.

In addition to direct utility savings and job creation, green buildings have been shown to improve the health and well-being of occupants, enhance productivity, reduce staff turnover, reduce patient hospitalisation time, and even enhance student achievement in green schools. Both the direct and indirect cost savings of integrated green building strategies are real and significant. The long-term impacts of green buildings form the pillars of a green economy that will catalyse environmental, economic and social sustainability.

EMPOWERING COMMUNITIES

Sustainable housing programmes, in many cases using carbon market tools such as the Clean Development Mechanism (CDM), are some of the most compelling examples of what it really means to be part of the green economy. Case studies of several projects that illustrate how green building practices are smart economic choices that will reduce poverty and protect the environment are outlined below.

"Sustainable building practices are not only helping to reduce our global carbon footprint – they are also helping to build better societies."

In Mexico, more than 8.9 million people currently live without adequate housing. On the outskirts of Tlajomulco, Mexico, lies the Los Silos project, one example of the government's efforts to address this problem while also honouring Mexico's commitment to reduce greenhouse gas emissions. Los Silos consists of 6,000 sustainable, affordable homes of the highest quality for low-income families. The world's first national sustainable housing programme qualifying for the CDM, Los Silos features a range of energy-efficient technologies. Greenhouse gas emissions are tracked and recorded, and credits are then traded on the international market.

A similar project is under way just south of Cairo. The Egyptian Government, together with the Egypt Green Building Council, is currently designing and planning an entire green village which will directly tackle the same housing challenges that Mexico is experiencing. Sustainable technologies and techniques will be used to develop a safe community where vulnerable citizens can regain their place and make positive contributions to Egyptian society.

Within this model, the proposed eco-village is expected to provide community members with guaranteed healthcare, basic education, religious guidance, effective social assimilation, work training and skill development. In return, the community will produce food, energy and engage in numerous co-operative enterprises.

In a poverty-stricken area of Cape Town, South Africa, one design and construction team strove to encompass the three pillars of sustainability in one building: environmental stewardship, social well-being, and economic growth and security. What is most impressive about the Tsoga Environmental Centre is not its bio-gas digester, wind turbines, or the onsite treatment facility for grey and black waste water. Rather, it is how the team has empowered the local community throughout the entire design and construction process, while sticking to environmental goals. The project team ensured all construction workers received specific skills training and transferable problem-solving skills, which will have long-term economic impacts. Elements of the building were specifically designed so that local small enterprises could supply materials. Brick recycling, door and window manufacture, reed ceilings and landscaping were outsourced to local enterprises.

Furthermore, material suppliers were required to comply with fair labour practices and labour-intensive construction methods were deliberately chosen – meaning that 80 per cent of the building budget could be allocated to employment, as opposed to the conventional 30-50 per cent.

MOVING FORWARD

These three diverse projects demonstrate why the green building movement is gathering momentum. Sustainable building practices are not only helping to reduce our global carbon footprint – they are also helping to build better societies and empower communities. As governments, from the local level all the way up to global leaders, form strategies to reduce carbon emissions and move to the new green economy, the case for green building has never been stronger.

Jane Henley is the Chief Executive Officer of the World Green Building Council, a role she assumed in February 2010. Previously, Jane was the founding Chief Executive Officer of the New Zealand Green Building Council, which she helped establish in 2005. She has also been on the boards of the WorldGBC and NZGBC. Jane is a director of the United Nations Sustainable Building Climate Initiative board, an active speaker, and passionate about business leading change. Jane is committed to driving market transformation that is underpinned by sound economic practices that simultaneously deliver financial, social and environmental benefits.

The **World Green Building Council** (WorldGBC) is at the forefront of the global green building movement. Its mission is to facilitate the global transformation of the building industry towards sustainability through market driven mechanisms. Established in 2002, the WorldGBC's membership has grown to more than 90 green building councils (GBCs) today, making it the largest organisation in the world influencing the global green building agenda.

World Green Building Council
c/o Build Toronto
200 King Street West, Suite 200
Toronto, ON, M5H 3T4, Canada
Email: jhenley@worldgbc.org
Web: www.worldgbc.org

REnescience
value from waste

From garbage to gas – making a business out of a problem

It all began with a radical idea: to turn the perception of waste water and household garbage from being a costly problem to a valuable resource for local energy production. The plan is to turn Fredericia Wastewater Treatment Plant into a refinery that utilises waste water and municipal solid waste as biomass that can be used for biogas production, with subsequent upgrading to natural gas quality, so that the gas can be distributed through the existing natural gas grid and used for heating and transport.

By boosting the ongoing biogas production in Fredericia Wastewater Treatment Plant using ground-breaking technology with waste as fuel, the municipality can earn a profit in a market with ever-rising energy prices and waste management costs. As a bonus, the municipality's need for manpower for its own waste and recycling management is minimised. In addition, there is an environmental gain from lower emissions of particulate matter and CO_2, and less residual waste has to go to landfill or incineration.

Future waste cycle.

THE FULL PICTURE

The full potential is reached when the whole value chain becomes involved. Fredericia Municipality is facing problems of expensive garbage disposal, waste water treatment, water purification, pollution from city traffic, access to phosphates for fertilisers – and last but not least, climate change. The public-private-innovation partnership with DONG Energy's biotechnology company REnescience seems to be the 'silver bullet' that can offer solutions to all those problems.

RENESCIENCE – SEPARATING WASTE WITH ENZYMES

In the REnescience process, mixed municipal solid waste (MSW) is separated through an enzyme treatment which liquefies biodegradable material. This allows for a second step which separates the resulting 'bio-liquid' from the remaining solid fraction. The bio-liquid is perfect for biogas production, both on a stand-alone basis and as a booster material for less potent biogas feedstocks such as waste water sludge and animal manure. The solid fraction comprising plastics, metals, glass etc. can now be more or less extensively recycled depending on local requirements. Alternatively, a storable fuel for high-efficiency electricity and heat production can be produced from the solid fraction.

A pilot plant (pictured) has been operating in Copenhagen since 2009 and the Scandinavian company expects the first commercial demonstration plant to come online by 2013.

BACK TO THE FUTURE

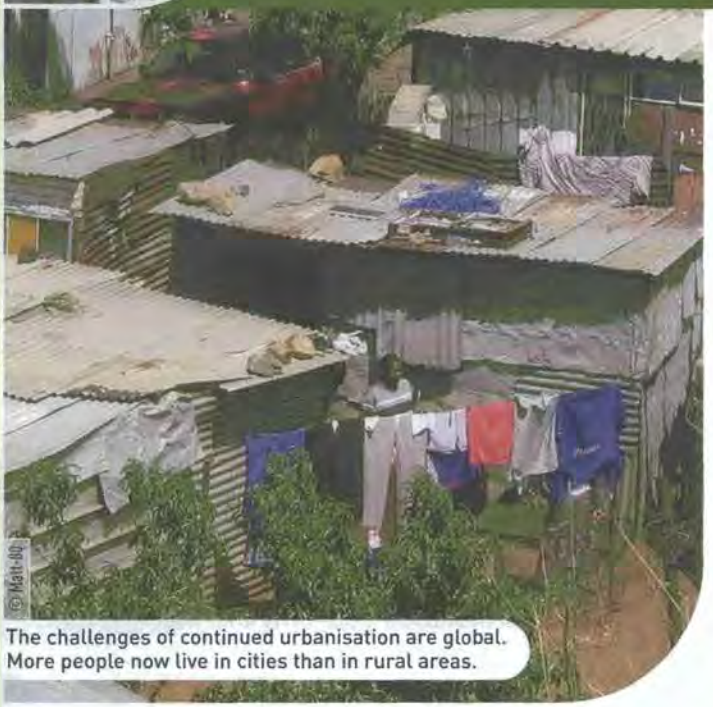
Together with DONG Energy, Fredericia Municipality is planning to change from diesel fuel for the city buses and refuse trucks, replacing it with biogas made from sewage and waste. In that way greenhouse gas emissions can be reduced by more than 100 per cent. Soon the garbage trucks will run on garbage, like Doc Brown's reactor in *Back to the Future*. In Fredericia, we have not invented the time machine, but we are forward-looking and determined to do our share in creating a better world.

Preben Birr-Pedersen, M.Sc, MBA, began his career in UNDP as a climate change consultant 15 years ago. He has since then worked in the field of energy and climate change, both in a private energy company and at the Danish Transmission System Operator as project investment manager and strategic planner.

Fredericia Municipality has 50,000 inhabitants and is located in the centre of Denmark. The city lies by the deep and narrow Little Belt strait, which is one of the main arteries for shipping traffic in Danish waters. Fredericia has formed an innovation partnership with REnescience as part of 'Fredericia Forming the Future' strategy that is aimed at drastically transforming the public sector.

Web: www.fredericia.dk; www.renescience.com

Cities catalysing global climate action



The challenges of continued urbanisation are global. More people now live in cities than in rural areas.

By **Yunus Arikan**, Manager, Cities Climate Center, Local Governments for Sustainability (ICLEI)

Engaging local governments as 'governmental stakeholders' is the key to ensure success in addressing the global challenge on climate change. In the first decade of the 21st century the world's urban population has exceeded the rural population for the first time. This trend is set to continue in the forthcoming decades. The urban structures we have built in the past 4,000 years have to be built again in the next 40 years to meet the challenges of continued urbanisation, and to match the demographic and consumption/production patterns, particularly in developing countries.

Our choices in planning cities will determine whether cities will be a part of the problem or the solution of our climate challenges. The choices are complex: constructing buildings and transport infrastructure, using energy, consuming goods and managing waste. Keeping the temperature increase within 2°C by the end of the century, compared with the global average in the past 200 years, will depend on the success of implementing low-carbon, climate-resilient, sustainable urban development patterns in both developed and developing countries. However, so far neither the United Nations Framework Convention on Climate Change (UNFCCC) nor its Kyoto Protocol contains any vision for action at the level of local government.

The recognition of local and subnational governments as governmental stakeholders in the agreement of the Cancun climate conference in 2010 (COP16) therefore marks a historical opportunity to mobilise the full potential of local and subnational action on climate mitigation and adaptation – a potential which has not been appropriately exploited in the first 20 years of the international climate regime.

The Local Government Climate Roadmap, the coalition for global climate advocacy of local governments since Bali 2007 (COP13), now aims to ensure that this recognition is fully reflected into practice. For one thing, progress towards low-carbon solutions at the local level has in many instances been greater than on a national scale. Through an enabling global framework for action, supported by access to much-needed financial and technical resources, local governments can provide significant contributions to scale up action at the national and international level.

RAISING AMBITIONS

So everyone needs to raise their ambitions. In 2009, the Copenhagen World Catalogue of Local Climate Commitments announced more than 3,000 obligations by local governments worldwide for reducing emissions of greenhouse gases. Numerous cities in both developed and developing countries are determined to ensure carbon neutrality or the transition to 100 per cent renewables, exceeding existing commitments of national governments at the UNFCCC level. If local commitments are appropriately integrated into national commitments, it is possible to be more confident of reaching the goals proposed by the scientific community.

> **«Numerous cities in both developed and developing countries are determined to ensure carbon neutrality.»**

Despite the lack of progress in global climate negotiations in 2010, local governments have further advanced their contribution to global efforts. They have introduced the Global Cities Covenant on Climate – the Mexico City Pact, a political commitment of local governments to advance climate action. They have also introduced the carbonn Cities Climate Registry (cCCR) as their concrete response to measurable, reportable, verifiable climate action. Both of these efforts aim to ensure transparency, accountability and

comparability of local climate action, so that the necessary resources can be rapidly mobilised.

Through the cCCR, local governments worldwide are now able to report their reduction commitments, greenhouse gas (GHG) emissions performance and mitigation/adaptation actions that have been implemented. The Registry is helping local governments to achieve transparency and accountability of local climate actions, demonstrate leadership and initiate a process to support direct access to global climate funds. At the same time national governments and the global climate community benefit by gaining a better understanding of the achievements, performance and ambitions of local climate action. The Mexico City Pact and the cCCR are, therefore, vital elements in informing policy-making and can contribute to formulating appropriate global climate policies which also incorporate involvement of local governments.

LOW-HANGING FRUIT STILL UNTASTED

Furthermore, developing an appropriate global governance model and generating adequate financial resources are key to the success for local climate action. So far, the finance architecture under the UNFCCC and its Kyoto Protocol has not fully met the expectations of local governments. As of 2009, less than 10 per cent of all projects under the Clean Development Mechanism are engaging local governments.

"The global climate community should not miss the opportunity to build upon the power, potential and ambitions of local climate action, in particular in the absence of global political leadership and determination."

The ICLEI Global Report *Cities in a post-2012 Climate Policy Framework* describes the huge potential in sectors such as buildings, waste and transport, which are defined as the 'low-hanging fruit' of mitigation, and are under direct control of local governments. Since the rules and legislative frameworks that create and regulate carbon markets have not been designed with urban mitigation projects in mind, various legal, technical and financial barriers to offset markets often appear to be insurmountable for urban projects, as pointed out in the OECD's *Cities and Carbon Market Finance* (2010).

It is expected that the Durban climate change conference in 2011 (COP17) will primarily focus on the institutional framework of the global climate regime. Local governments are hoping that new institutions and mechanisms focusing on climate finance should not repeat the same mistakes of ignoring the local realities and demands. In terms of adaptation financing, the ICLEI white paper *Financing the Resilient City* makes the case for priority to be given to:

- New adaptation and resilience standards, similar to recent 'green building' standards that have been mainstreamed into urban development and construction over the last decade;
- Specialised financial instruments, for comprehensive local adaptation and resilience upgrading projects in urban areas and systems known to be highly vulnerable;
- Building additional local institutional capacity, to prepare, structure and manage large scale redevelopment.

LOCAL-FRIENDLY FUNDING NEEDED

It is also expected that funds should be channelled to locally relevant and appropriate development, rather than conventional global financing mechanisms determining which local projects are eligible for funding. Sustainable and resilient urban development that prioritises climate change adaptation, poverty alleviation and improved human well-being needs to be defined as a thematic window in the design of the Green Climate Fund under the UNFCCC: an aspect that has also been called for in the 2011 Bonn Declaration of Mayors.

The global climate community should not miss the opportunity to build upon the power, potential and ambitions of local climate action, in particular in the absence of global political leadership and determination. When local governments are not only being recognised but also supported as key actors in climate action – and thus granted an enabling framework in combination with better, direct-access funding – cities can accelerate their performance. They will evolve from key actors into highly effective catalysts in the battle against climate change.

Yunus Arikan is Manager of the Cities Climate Center, ICLEI – Local Governments for Sustainability, Director of the Secretariat of the World Mayors Council on Climate Change (WMCCC) and the Focal Point for the Local Governments and Municipal Authorities (LGMA) constituency to the UNFCCC.

ICLEI – Local Governments for Sustainability is an association of over 1,220 local government members who are committed to sustainable development. The members come from 70 different countries and represent more than 569,885,000 people. ICLEI is an international association of local governments as well as national and regional local government organisations who have made a commitment to sustainable development. It provides technical consulting, training and information services to build capacity, share knowledge and support local government in the implementation of sustainable development at the local level. ICLEI's basic premise is that locally designed initiatives can provide an effective and cost-efficient way to achieve local, national, and global sustainability objectives.

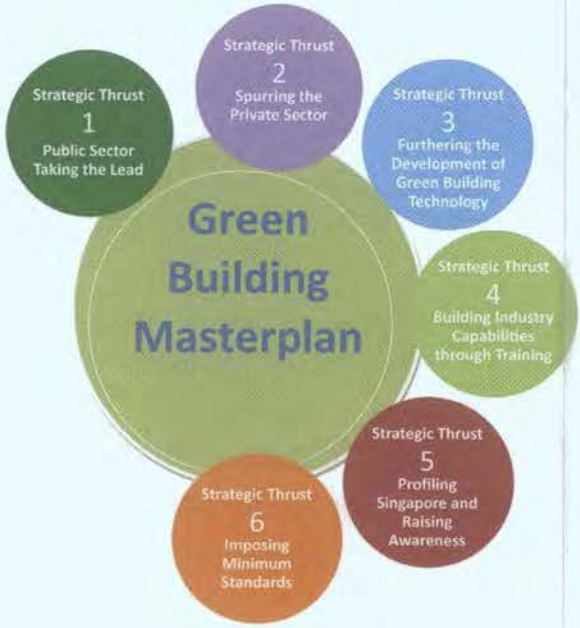
ICLEI – Local Governments for Sustainability
Kaiser-Friedrich-Str. 7, 53113 Bonn, Germany
Tel: +49 (0)228 976299 00 | Email: climate.center@iclei.org
Web: www.iclei.org/climate-roadmap; www.mexicocitypact.org
www.citiesclimateregistry.org

Building and Construction Authority

Greening the built environment: a national priority for Singapore

Singapore, a small country with an area of just under 700 sq km, is resource-scarce and dependent on imports for most of the country's consumer needs, including energy. In 2008, the Inter-Ministerial Committee on Sustainable Development was set up to formulate a national strategy for Singapore's sustainable development in the context of emerging domestic and global challenges, as well as its tropical environment. Among the decisions that emerged from this committee was an ambitious target to 'green' at least 80 per cent of all buildings in Singapore by 2030.

The Building and Construction Authority of Singapore (BCA), the government agency under the Ministry of National Development, leads the effort in driving this green movement for the nation. BCA champions the development of a holistic and integrated approach to sustainable building through various incentives and educational programmes.



SINGAPORE'S GREEN JOURNEY

BCA aims to become a global leader of green solutions in tropical and subtropical cities. "Singapore is among the first few countries to legislate the greening of new buildings nationwide," says Dr John Keung, CEO of BCA.

Leading by example, the government has targeted the green retrofit of all existing air-conditioned public sector buildings of more than 10,000 m^2 in floor area by 2020. Meanwhile, all new air-conditioned public sector buildings of more than 5,000 m^2 in floor area must attain the Platinum status – the highest rating of the BCA Green Mark scheme, which was launched in January 2005 to drive the development of more environmentally friendly buildings in Singapore.

To meet the increasing demand for green building professionals, the BCA Academy has in place a wide range of training and educational programmes to build capabilities in this area. The Academy also collaborates with renowned institutions abroad, such as the University of Nottingham in the United Kingdom to jointly offer a Master of Science in Sustainable Building Design. More recently, the Academy partnered with the University College London to offer a Master of Science in the Facility and Environment Management programme.

Currently, the BCA is focusing its efforts on greening the bulk of existing buildings. To this end, the BCA introduced a Green Mark Incentive scheme worth S$100 million to encourage building owners to upgrade their existing buildings to be more energy efficient and environmentally friendly.

BCA'S ZERO ENERGY BUILDING

The BCA developed South-east Asia's first Zero Energy Building (ZEB) that was retrofitted from an existing building at the Academy in 2009. It was a collaborative project between the BCA and other public and private agencies. The ZEB serves as a test-bed centre for new green-building innovations and technologies; those that have been successful can be replicated in other building projects to enhance their environmental performance.

BCA developed South-east Asia's first Zero-Energy Building, which was retrofitted from an existing building, in 2009.

INTERNATIONAL RECOGNITION

Over the years, BCA's efforts in green building have been increasingly gaining international recognition. In 2010, the BCA was the first government agency outside North America to receive the Aspen Institute's Energy and Environment Award in the government category, for its comprehensive policies and programmes in steering the industry toward the development of green buildings and sustainable construction in Singapore.

CEO of BCA, Dr John Keung, receiving the Aspen Institute's 2010 Energy and Environmental Award in the government category. BCA was the first government agency outside North America to receive this prestigious award.

Table 1. Overall ranking of Asia-Pacific cities in green building policy.

1. Singapore	5. Taipei	9. Hong Kong
2. Tokyo	6. Melbourne	10. Auckland
3. Seoul	7. Osaka	
4. Sydney	8. Busan	

Source: Solidiance

"For the judges, BCA's top-to-bottom and comprehensive approach in tackling this important issue of emissions reduction and sustainability in the built environment was an innovative approach that had replication potential," said Eric Pooley, one of the Aspen Institute judges as well as deputy editor of *Bloomberg Businessweek* in New York.

In early 2011, consultancy firm Solidiance ranked Singapore first in green building policy among cities in the Asia-Pacific region, ahead of Tokyo, Sydney and Seoul (Table 1). Dr John Keung describes the honour as a "testimony of the progress we have made in promoting green buildings here."

Since the launch of its Green Mark scheme in 2005, BCA has been widely recognised as a leader in green building in the region. It took the lead in the formation of the Tropical and Subtropical Green Building Council Alliance and has participated in major green building activities and events internationally. BCA has also been working with countries like China and Bahrain to develop local green building capabilities and standards such as the Tianjin Eco-City Green Building Evaluation Standard in China.

The United Nations Environment Programme (UNEP) was so impressed with Singapore's efforts in green buildings that it will work with BCA to form a collaborating centre, the first in Asia and one of the few centres in the world collaborating with UNEP, to drive greater adoption of sustainable buildings within the region. BCA is currently producing a series of 'State of Play' reports for eight Southeast Asia countries to contribute to the UNEP-Sustainable Buildings and Climate Initiative's (UNEP-SBCI) growing publications assessing policies and practices in sustainable building.

The BCA's Green Mark scheme has now been adapted for use in more than 10 countries including China, Malaysia, Vietnam, Brunei, India, Thailand, Saudi Arabia, Indonesia, the Philippines and Tanzania.

"We believe that the approach we have taken to shape a sustainable built environment in Singapore is one that can be reproduced around the globe," adds Dr Keung. "That is why we are always pleased to share the Singapore formula with government authorities and non-governmental organisations that are keen to accelerate the green building movement in their cities."

Building and Construction Authority
5 Maxwell Road, #16-00 Tower Block MND Complex
Singapore 069110
Tel: +65 6325 7720 | Fax: +65 6325 4800
Email: bca_enquiry@bca.gov.sg | Web: www.bca.gov.sg

Building strengths, defining distinctions

Keppel Land Limited is the property arm of the Keppel Group, one of Singapore's largest multi-national groups with key businesses in offshore and marine, infrastructure and property. As one of Asia's premier property companies with beginnings dating back to 1890, Keppel Land has built up a sterling portfolio of award-winning residential and commercial properties developments, many of which are recognised for their sustainable design, construction and operational practices.

INTEGRATING SUSTAINABILITY INTO BUSINESS

A leading developer of green buildings across Asia, Keppel Land adopts a proactive approach towards environmental management to minimise environmental impact through innovations in green technologies and preserving biodiversity.

The company's dedicated efforts in sustainability are championed top down from the Group CEO and spearheaded by the Corporate Social Responsibility (CSR) Committee, which comprises representatives from various business units as well as dedicated managers responsible for implementing sustainable policies. The Committee consolidates and aligns Keppel Land's green initiatives and provides a clear strategic direction to integrate environmental practices into the company's business operations.

KEPPEL LAND'S SUSTAINABILITY JOURNEY

2006 ▪ Achieved first Green Mark Gold award in Singapore;

2007 ▪ Formed Environment Management Committee, which was renamed the CSR Committee in 2011;

2008 ▪ Embarked on ISO 14001 Environmental Management System (EMS) certification for Singapore property development operations;
▪ Attained Eco-Office certification by Singapore Environment Council for corporate headquarters;
▪ Achieved first BCA Green Mark award in Vietnam;

2009 ▪ Expanded ISO 14001 EMS certification scope to include property management in Singapore and property development in China and Vietnam;
▪ Ocean Financial Centre became the first high-rise office development in South-east Asia to achieve Platinum level LEED-CS pre-certification;
▪ Achieved first BCA Green Mark Gold award in China;

2010 ▪ One of only two Singapore companies to be listed on the Dow Jones Sustainability Asia Pacific Index;
▪ The only Singaporean company to be included in the Sustainable Asset Management Sustainability Yearbook 2011;
▪ Named Most Admired ASEAN Enterprise for CSR at the ASEAN Business Awards;
▪ Bagged the Merit Award for corporate environmental leadership at the Singapore Environment Achievement Awards;

2011 ▪ Selected as an index component of the Dow Jones Sustainability World Index in addition to the inclusion in the Dow Jones Sustainability Asia Pacific Index for the second consecutive year;
▪ Clinched the Product Excellence Gold Award for Ocean Financial Centre at the Global CSR Awards 2011;
▪ Ranked the Best Performer in Asia and conferred the 'Green Star' status in the Global Real Estate Sustainability Benchmark 2011;
▪ Bestowed the 'Best in Class' status by Norwegian financial institution Storebrand;
▪ Conferred Best Sustainability Report Award at ACCA Singapore Awards for Sustainability Reporting.

Moving ahead, Keppel Land has set as a benchmark for all its projects in Singapore and overseas the goal to achieve at least the Green Mark Gold rating by the BCA or its equivalent such as the United States' Leadership in Energy and Environmental Design (LEED).

Today, Keppel Land's portfolio includes 26 BCA Green Mark certifications for its developments spanning across Singapore, China, Vietnam and Indonesia. In Singapore, all the company's investment buildings have achieved the Green Mark Gold award, which recognises the green features

and energy efficient systems incorporated in these buildings. Annual energy savings from these investment buildings are estimated at over 5.3 million kWh – equivalent to an annual reduction of over 2,600 tonnes of carbon emission.

THE LONG-TERM CSR ROAD MAP

Recognising that a key challenge for developers is balancing environmental sustainability with economic viability, Keppel Land has set targets for its development projects to improve their overall environmental performances. Some of these environmental performance targets include:

- Using at least 40 per cent of construction materials sourced regionally within 1,000 km;
- Using building materials with at least 20 per cent recycled content for new developments;
- Ensuring that at least 70 per cent of the gross floor area (GFA) is well lit by natural light;
- Ensuring at least 20 per cent and 40 per cent of the total site area of its commercial buildings and residential developments respectively are covered by vegetation.

Since 1997, Keppel Land has detailed its environmental initiatives in its annual reports. In 2007, the company produced its first standalone CSR report online. Working towards higher standards each year, Keppel Land has since published three GRI-accredited CSR reports, improving from a GRI-accredited Level C report in 2008 to a GRI-accredited Level B+ report with AA1000 Assurance in 2010, which won the Best Sustainability Report Award at the ACCA Singapore Awards 2011.

The company is now currently working towards aligning its business operations with the ISO 26000 Standard, a voluntary international standard which provides guidance on social responsibility. With the integration of social responsibility into Keppel Land's values and practices, the company will bring corporate social responsibility to the next level.

INSTILLING A GREEN CULTURE

Keppel Land's green benchmark achievements are largely supported by its pool of talents who possess the knowledge and expertise to contribute to a greener environment. As at end-2010, about 60 per cent of the company's 64 project managers in Singapore and overseas have been trained as Green Mark Managers (GMM), Green Mark Facilities Managers and Green Mark Professionals, as well as the Singapore Certified Energy Manager. The company plans to have all its project managers GMM-certified by 2013.

DEVELOPING ECO-ICONS

Ocean Financial Centre (OFC), the first high-rise office development in Southeast Asia to be conferred the prestigious LEED Platinum award and the first office development in Singapore to achieve the highest BCA Green Mark Platinum Award, is a showcase of green innovations.

These include the largest solar panel installation for high-rise buildings in Singapore's central business district, an energy-efficient hybrid chilled water system, an integrated paper recycling facility, energy-saving features such as the eco-switch and regenerative drive lifts, and the largest green wall for office buildings in Singapore.

Through these green features, OFC will achieve overall energy savings of 35 per cent and water savings of 42 million litres per year.

Propelling Keppel Land's status as a green developer on the international front is the development of pioneer eco-friendly homes in the Sino-Singapore Tianjin Eco-City. Seasons Park, Keppel Group's first collection of eco-homes in Tianjin Eco-City, is distinguished by green features such as a thermal-performance building envelope, solar hot water heaters and pneumatic refuse collection systems.

Ocean Financial Centre, Singapore.

A landmark bilateral project between the Singapore and China governments, the 30 sq km Tianjin Eco-City will eventually be transformed into a sustainable development model of a practical, liveable city that is in harmony with resource-efficiency, environmental protection and ecological conservation.

Recognising the two-fold benefit of eco-friendly business practices on the environment and on the bottom line, Keppel Land encourages active participation from its various key stakeholders, through its *Go Green with Keppel Land* outreach programme, where various environmental-themed events are regularly organised by the CSR Committee.

Tianjin Eco-City, China.

Keppel Land Limited, 230 Victoria Street, #15-05 Bugis Junction Towers, Singapore 188024
Tel: +65 6338 8111 | Fax: +65 6337 7168
Email: csr@kepland.com.sg | Web: www.keppelland.com.sg

5 Star Green Star SA rated building.

Buildings count for climate: a developing country sector response

By **Dr Rodney Milford**, Programme Manager, Construction Industry Development Board (CIDB)

Mitigation of, and adaptation to, climate change is a key priority of the South African government, and is being addressed by a wide range of stakeholders. This commitment is reflected in the fact that South Africa is a signatory to both the UNFCCC and the Kyoto Protocol. Importantly, as is the case in many countries around the world, the important role of building and construction is recognised in South Africa as being key to climate change mitigation and adaptation.

The development of *Agenda 21 for Sustainable Construction in Developing Countries: a Discussion Document* is regarded by many as a seminal contribution to studies of climate change and the building sector. It was prepared by Dr Chrisna du Plessis of CSIR Building and Construction Technology for the International Council for Research and Innovation in Building and Construction (CIB) and UNEP-IETC in 2002. Agenda 21 was developed from working papers developed by expert working groups in Asia, Latin America, and Africa, under the auspices of an international working group, and made an impact both internationally and in South Africa.

The foreword to Agenda 21 was written by Spencer Hodgson, then CEO of the Construction Industry Development Board (CIDB), an entity of the national Department of Public Works. The foreword notes that "... the discussion document represented both a sector response and a developing country response to the challenge of sustainable development. It builds on the principles of the UN Agenda 21 formulated at the Earth Summit in Rio and was published as a contribution to the Johannesburg World Summit on Sustainable Development. The discussion document coincided with the renewed commitment of developing countries to take leadership for social and economic development."

"For developing countries, the objectives of future sustainability are inexorably bound together with the pressing need to attain a sustainable present."

This commitment to take leadership for social and economic development is clearly demonstrated by many

developing countries today. The foreword noted that "the present drags the past in its wake. For developing countries, the objectives of future sustainability are inexorably bound together with the pressing need to attain a sustainable present grounded in economic growth. The enhanced capacity of governments, innovation, the formation of domestic skills and construction capability are all fundamental to the infrastructure that will unlock economic growth and an attack on poverty, hunger and disease."

Together with many other influential pieces of work, *Agenda 21 for Sustainable Construction in Developing Countries* influenced a wide range of stakeholders on the pressing challenges of climate change adaptation and mitigation.

The South African government's position on climate change mitigation has been shaped by the Long Term Mitigation Scenarios (LTMS) that were commissioned by the South African Cabinet in March 2006 to examine the potential for mitigation of South Africa's greenhouse gas (GHG) emissions. The process was led by what was then the Department of Environment and Tourism under the auspices of an LTMS Scenario Building Team comprising of government, business and civil society. The LTMS informed the Cabinet's climate change position, and President Zuma announced South Africa's position at the UN Climate Change Conference in Copenhagen in December 2009.

"While government leadership is fundamental, mitigation and adaptation will ultimately be driven by a public-private partnership."

South Africa's climate change mitigation position was also captured in the Department of Water and Environment Affairs' National Climate Change Response Green Paper of 2010, namely that subject to international support "South Africa will follow a peak, stabilisation and decline greenhouse gas trajectory over the next 60 years. This will mean that emissions will peak during the period 2025 to 2035, will stabilise until the 2050 to 2060 period and will then decline".

The Green Paper sets out the South African's strategy for both mitigation and adaptation. Significantly, it notes that "... although there will be costs associated with South Africa's greenhouse gas emission reduction efforts, there will also be significant short- and long-term social and economic benefits, including improved international competitiveness that will result from a transition to a low carbon economy. Furthermore, these costs will be far less than the costs of delay and inaction."

The LTMS recognises the important role of buildings in meeting these GHG mitigation targets, and the role of buildings in GHG mitigation in South Africa was further examined in the 2009 UNEP-SBCI/CIDB report *Greenhouse Gas Emission Potentials from Buildings in South Africa; A Discussion Document*. In line with international and local experience, this document highlights, among other things, the need for:

- Prioritising the building sector;
- A national focus on the building sector – a public-private partnership for climate change in the building sector;
- Translating intent into action;
- Focusing on retrofitting, and;
- Government to lead by example.

While government leadership is fundamental in addressing climate change mitigation and adaptation in any country, mitigation and adaptation will ultimately be driven by a public-private partnership. And this is particularly true in the building sector, which involves a whole range of stakeholders in the delivery, operation, maintenance and demolition of buildings.

GREEN BUILDING COUNCIL RATINGS

South Africa is fortunate to have strong leadership by both government and the business sector – supported by a civil society that is awakening to the challenges of climate change. Although possibly lagging the pace of implementation in some overseas countries, the business sector in South Africa has begun to embrace the challenges of climate change – including in the building and property sector. Many of the leading property developers and building owners are actively pursuing strategies to reduce the environmental impact of their buildings, and the impact of the products used in the operation of their buildings. This is clearly illustrated in South Africa by the South African Property Owners Association (SAPOA) that helped establish the Green Building Council of South Africa (GBCSA). The response to the GBCSA and its Green Star SA rating tools has probably exceeded all expectations, and the GBCSA has seen an exponential growth in applications for buildings to be rated since the launch of the GBCSA in 2007. To date,

Sharing green building experiences.

nine buildings have been certified, with over 23 projects registered for consideration. Significantly, the public sector has also shown a strong interest in having its own new buildings rated.

There has been significant interest in the Green Star SA rating tools by several countries in Africa, and GBCSA is actively supporting the green building theme in many African countries.

The Green Building rating tools are being recognised by government in South Africa as one of a portfolio of instruments that are required to support GHG mitigation in the building sector – including codes of practice, standards, energy performance certificates, demand side management requirements, etc. This commitment to climate change mitigation is demonstrated by the development of a Green Star SA green building rating tool for public and educational buildings, sponsored by the CIDB of the Department of Public Works.

A SECTOR-SPECIFIC RESPONSE

Clearly, a sector-specific response is required to address climate change mitigation and adaptation, and the national Department of Public Works announced in 2010 that the Department is commissioning the development of a Green Building Strategy and Regulatory Framework for South Africa that will create "a collaborative enabling environment for the construction and operation of sustainable building construction activities by the public and private sectors."

> **"The building sector is being recognised for the role that it plays in climate change mitigation and adaptation."**

More recently, the Minister of Public Works, Gwen Mahlangu-Nkabinde, highlighted that a key element is that the Framework recognises that climate change and mitigation cannot be seen in isolation of socio-economic context, and the Framework "would take into account key government imperatives such as sustainable building, job creation, development in under-developed areas, enterprise development and social cohesion." The Framework will be released shortly for public comment.

THE KEY ROLE OF THE BUILDING SECTOR

Climate change is probably the greatest challenge facing humanity. Against the backdrop of international negotiations to achieve binding reduction targets, it is clear that traction is being achieved around the world towards addressing these challenges in many countries, including South Africa. Furthermore, the building sector is being recognised for the role that it plays in climate change mitigation and adaptation.

Within the building sector, progress is being made in addressing the challenges of climate change – in developed countries, in developing countries, and in South Africa. Leadership is rising to take on the challenges. But, while much is being done, more is still needed. Within the building sector, the greatest challenges possibly lie in bridging the gap between 'green buildings' and 'sustainable buildings' – the gap between environmental needs and socio-economic needs, the gap into the 'green economy'.

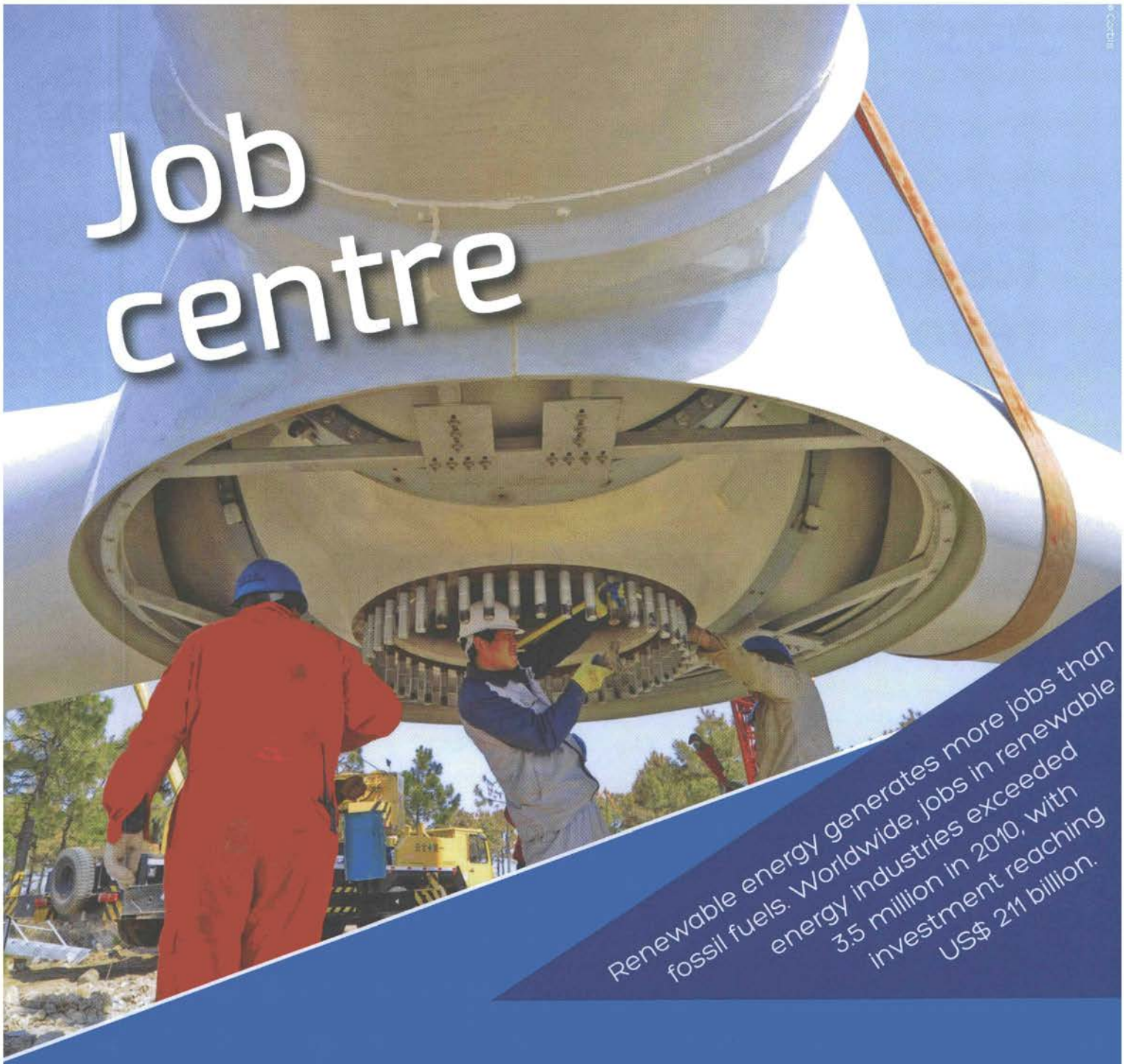
But, this is the area that the building sector is well suited to. Investment in buildings and infrastructure underpins the economic growth of any economy. The building sector is also the sector with one of the highest job-creation multipliers, and buildings also have among the highest GHG abatement potentials for the least cost – which is being recognised as the 'double dividend' in many economies around the world. Investment in sustainable buildings and sustainable infrastructure around the world has therefore been recognised as central to government stimulus packages – packages focusing on the green economy, focusing on job creation and focusing on bringing forward new infrastructure development and on retrofitting of buildings. The building sector has a central role to play in climate change mitigation and adaption.

Governments can do much to stimulate the role of buildings in climate change and in the green economy. But above all, while much is being done, accelerated and focused attention needs to be given to translating intent into action. ●

Rodney Milford is currently Programme Manager, Construction Industry Performance at the CIDB, and previously Director of CSIR Knowledge Services, and Director of CSIR Building and Construction Technology (Boutek). Rodney has been involved in several national and industry policy initiatives, and was a member of the drafting team of the South African government's White Paper on Creating an Enabling Environment for Reconstruction Growth and Development in the Construction Industry. He currently represents the CIDB on the UNEP Sustainable Building and Construction Initiative (SBCI), and was responsible for the development of the UNEP SBCI/CIDB discussion document *South African Report on Greenhouse Gas Emission Reduction Potentials from Buildings*. Rodney is currently co-Chair of the UNEP SB Index Steering Committee.

The **Construction Industry Development Board** (CIDB) – an entity of the Department of Public Works – was established by Act of Parliament to promote a regulatory and developmental framework that builds the construction delivery capability for South Africa's social and economic growth, and a proudly South African construction industry that delivers to globally competitive standards. The CIDB's focus is on sustainable growth, capacity development and empowerment; improved industry performance and best practice; a transformed industry, underpinned by consistent and ethical procurement practices; and enhanced value to clients and society.

Box 2107, Brooklyn Square, Pretoria, 0075 South Africa
Tel: +27 12 482 7200 | Fax: +27 12 349 8986
Email: cidb@cidb.org.za | Web: www.cidb.org.za



Job centre

Renewable energy generates more jobs than fossil fuels. Worldwide, jobs in renewable energy industries exceeded 3.5 million in 2010, with investment reaching US$ 211 billion.

renewable energy not only
combats global warming,
it also generates employment

UNEP

www.unep.org

GREEN ECONOMY: POWERING CLIMATE SOLUTIONS

PioTrans

Rea Vaya – an environmental revolution in Johannesburg

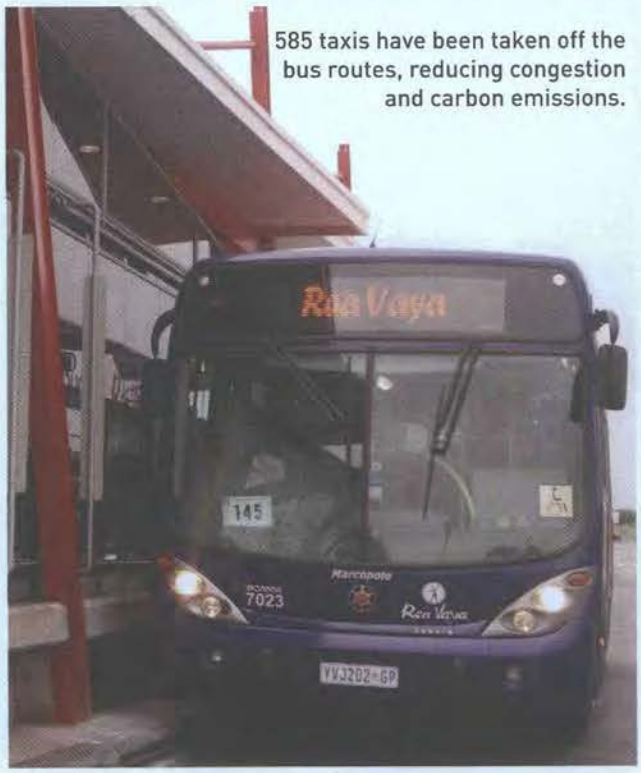
Since Johannesburg is the economic hub of Africa it has people from all walks of life flocking to it on a daily basis. Known as the city of gold, it has always attracted migrants like a magnet because of its gold mines and a promise of a better future.

Over a hundred years later, this has resulted in 'Joburg' becoming one of the densely populated cities in South Africa, resulting in frustrating traffic jams during rush hours – because most of the people live far away from their workplaces.

During its reign, the apartheid system made sure that 'non-whites' stayed as far away from the city centre as possible, paid them a below-living-wage salary and provided no decent public transport. As a result, the taxi industry emerged, but because it was not formally organised, it became the type of enterprise where 'anything goes'. If a taxi was good enough to move, it was good enough to transport people; whether it was safe or not was a different story.

The taxi industry became a lucrative business and continued to grow as the public transport need increased. Private bus companies came in to help the situation, but were not as popular at the minibus taxis.

All this changed when Rea Vaya, a City of Joburg bus rapid transit system, was introduced in late 2009. Suddenly people were able to bypass the rush hour traffic. A trip from Soweto to town – that used to take a dreaded one and a half hours – was now possible in just 30 minutes. This is because Rea Vaya uses designated lanes, stopping only at its bus stations.



585 taxis have been taken off the bus routes, reducing congestion and carbon emissions.

ENVIRONMENTALLY FRIENDLY AND AFFORDABLE

However, the system not only brought comfort and convenience to people's travel, it also eased the burden on the environment. An important characteristic is to reduce greenhouse gas emissions and minimise their impact on the climate. "Joburg aspires to be recognised in international forums that discuss common goals for a world facing the negative effects of climate change," says Flora Mokgohloa, Joburg's executive director of environment.

Africa's first streamlined bus rapid transit has been lauded internationally for being the single largest climate change initiative ever undertaken by the City of Johannesburg, in dealing with congestion on roads, air pollution and greenhouse gases. According to Joburg's portfolio head of transportation, Rehana Moosajee, Rea Vaya is environmentally friendly, safe and affordable. It operates a fleet of low-sulphur diesel buses that emit less greenhouse gases. And before it was set up, the bus system was researched and tested to determine its potential effects on the environment. It is estimated that it will save 1.6 million tonnes of CO_2 equivalent emissions by 2020 if 15 per cent of private vehicle users living near the city centre switch to it.

Rea Vaya bus operation, ownership of the buses and driver employment is managed by the private company PioTrans. Its board includes 13 non-executive directors representing taxi investment companies, all former taxi operators, and three executive directors appointed into the top management positions. Victor Cordoba is the chief executive officer, Dumisani Mtambo is his deputy and Eric Motshwane is the director of corporate affairs.

Written by Modishakgoshi Wa Bakwena

Web: www.reavaya.org.za | www.piotrans.co.za

© Karl Fjellstrom, ITDP

The bike sharing programme in Guanzhou, China links 5,000 bicycles in over 100 stations with the metro, BRT stations and the city's greenways.

Sustainable low carbon tranport: a weapon against climate change

By **Michael Replogle**, Founder and Policy Director and **Ramon Cruz**, Policy Consultant for the Institute for Transportation and Development Policy (IDTP)

While the transport sector contributes substantially to global greenhouse gas emissions (GHGs), it has received little attention from international climate and environmental experts compared with energy, agriculture, or forests. The transport sector has lagged in receiving funds for mitigation and adaptation projects, but there are opportunities to achieve large CO_2 reductions with net negative costs per ton by aligning carbon finance to support sustainable mobility planning, measurement and monitoring, and shifts in transport funding. There are a growing number of success stories and models for countries, cities and institutions in the area of sustainable low carbon transport.

The transport sector accounts for 13 per cent of GHGs emissions and 23 per cent of energy-related global emissions. By 2050, the OECD predicts a 120 per cent growth of global transport emissions above 2000 levels. Transport-related CO_2 emissions are expected to increase 57 per cent in the period 2005-2030. While the largest share of GHG emissions from the transport sector is emitted in developed countries, 80 per cent of the predicted growth is expected to come from developing countries (IEA, 2008). Countries such as China, India and Brazil are experiencing rapid economic growth as well as rapid urbanisation, rapid motorisation, and attendant growing disparities in access to opportunities.

The world cannot address the climate change challenge and deal with increasing social inequalities without adopting more sustainable land transport strategies. Studies such as *Moving Cooler* (2008), the European Commission's white paper, *Towards a competitive and resource efficient transport system* (2011), and the International Energy Agency's globally-focused report, *Transport, Energy and CO_2: Moving toward sustainability* (2009), show how the transport sector could cut its GHG emissions by one-half or more over several decades at a net negative cost per tonne. All agree this

will require the 'avoid-shift-improve' paradigm: avoiding low value or unnecessary travel with better telecommunications, planning and pricing; shifting travel to lower carbon modes; and improving the efficiency of remaining travel through improvement in vehicles, fuels, and network operations.

Economic growth and modernisation need not bring total transport system motorisation. Indeed, transformational initiatives in cities from Bogota, Curitiba, Guangzhou and Ahmadabad show opportunities for emerging economies to leapfrog the inefficient and costly urban development path laid out by countries like the United States, which will face growing challenges in a world of high cost oil. A low-carbon mobility path can foster more efficient economic growth with far better access to opportunities and mobility for the majority of the world's population who are unlikely to have access to individual cars in coming decades.

THE INTERNATIONAL CLIMATE FOR FINANCING SUSTAINABLE TRANSPORT

Despite their promise, for a variety of reasons low-carbon sustainable transport initiatives have not benefited from the climate change mitigation financial mechanisms under the UNFCCC process and the Kyoto Protocol. Only 36 of the 3,329 projects within the Clean Development Mechanism pipeline and six of the 3,395 projects that have been registered by September 2011 are transport projects. Existing carbon finance was designed with the energy sector technology in mind. It is poorly suited to recognise opportunities for GHG reduction in the transport sector, where investments are driven by non-energy related criteria. System boundaries and GHG accounting are messy, and behavioral interactions, subsidies, perverse pricing incentives, and market failures abound.

The transport sector needs to be specially recognised in future agreements following the first commitment period of the Kyoto Protocol in 2012, and in bilateral and regional climate change initiatives. Without such recognition, carbon finance is likely to focus on more costly and less effective energy technology fixes rather than enabling low carbon sustainable transport that could do more to cut emissions while supporting more equitable and robust economic development.

From the current available funding and spending in transport infrastructure (around US$1 trillion) worldwide, only a small portion is dedicated to sustainable projects, according to a recent study from the ITDP. This is partly because the majority of these funds, which come from domestic sources of public finance (about 65 per cent), is directed towards building roads with little attention to equity or environmental impacts. Private investment flows or international debt finance (around 34 per cent) follow similar schemes and develop goods and services that support rapid motorisation, excluding environmental and social indicators from market signals. Official development assistance, only about one per cent of the funding available, often tries to leverage its funding by teaming with bigger flows mentioned above. Climate finance for transport projects represents only 0.01 per cent of the money available for infrastructure projects.

Climate finance could play a strategic role in shifting spending towards sustainable transport. The billions of dollars from climate finance not only should include a higher portion of transport-related projects, but should be used strategically to leverage support for smart projects financed by the international development community. Incentive funding could enable governments and their partners in the developing world to enhance institutional capacity to develop sustainable mobility plans at the metropolitan and national level. It could finance development of better data measurement, monitoring, reporting, and analysis systems to understand transport systems performance and opportunities to improve infrastructure, operations, and management. It could provide seed funding to advance sustainable mobility pilot programmes to demonstrate best practices and take them to scale, spurring technology transfer in such areas as intelligent transport systems, public transport system management, and freight logistics and operations.

But to facilitate this, multilateral development banks and bilateral aid agencies should change the way they evaluate projects and account for GHG impacts and carbon intensity of the initiatives they support. They should adopt targets

BIKE SHARING PROGRAMMES

Over 50 cities around the world have started bike sharing programmes to promote better mobility and commuting options for its citizens and promote healthier lifestyles. More complete streets that allow different modes of transport are often more lively, safer streets that foster economic development. Bike sharing programmes should be part of any mobility plan targeted to reduce traffic congestion and GHG emissions. The bike sharing programme in Guangzhou, China, where the city government placed 5,000 bicycles in over 100 stations around the city, has links to the metro, BRT stations and the city's greenways, providing its citizens with easier and faster commutes.

WHAT INDIVIDUAL FIRMS AND ORGANISATIONS CAN DO

Around the world, employers at private firms, government agencies or civic organisations are following a wide range of initiatives to promote low carbon travel among the staff. By locating themselves in a mixed use area, firms can encourage the use of non-motorised modes of transport. Providing bicycle parking, shower rooms, lockers and bicycles for short daily trips promotes healthier transport practices.

Local procurement is another area where firms can buy local supplies, products and furniture and reduce their carbon footprint. Finally, by becoming active in local business associations and building civic partnerships, firms can support private and public policies that promote low carbon transport practices while helping their bottom line.

that support sustainable transport and report on their own progress and performance. The Asian Development Bank and Inter-American Development Bank have recently adopted sustainable transport initiatives, with goals of spending less on motorway construction and much more on urban transport. They, the World Bank and other aid agencies should direct their technical assistance to develop capacities, institutions and knowledge, as well as aligning their lending criteria with sustainability objectives, with more transparency and reporting. There is an urgency to create partnerships that will shift the balance towards allocating existing resources in a sustainable way, add increased funding for areas where resources are currently lacking, and pay for the full cost of transport, including environmental depreciation.

THE ROLE OF NATIONAL GOVERNMENTS

National governments can play a big role in incentivising low carbon transport by shifting domestic budgets towards sustainable investment. National infrastructure investment funds, such as India's National Urban Renewal Mission and Mexico's National Mass Transit Program (PROTRAM), have the potential to improve the efficiency of the transport sector and steer it towards a lower-carbon development path. Developed countries can shape how their international support for transport is provided to developing countries. All governments can collect data and adopt sustainable transport goals, with monitoring and reporting on performance. They should be open to creative models for project finance such as public-private partnerships. Equally important is applying appropriate pricing and taxation for motor fuel, discontinuing subsidies to unsustainable projects and fossil fuels.

National governments should support their city leaders that control land use and much transport investment and operations. Popular mayors in developing country cities such as Curitiba, Brazil, Bogota, Colombia or Guangzhou, China, have been at the forefront of innovative urban development. The boxes on bus rapid transit and bike sharing expand on two examples of how a city can help shape urban development in ways that sustain economic growth, improve mobility for its citizens and reduce GHG emissions.

A NEW SUSTAINABILITY

As the world opens a new round of UNFCCC negotiations in Durban and tries to renew its commitment to tackle climate change in united way, it is important to raise the profile of land transport strategies to a more important place. As discussed in this article it is possible to pass from an unmanaged motorisation, in the form of subsidies for motor fuel, expansion of high speed roads and disorganised sprawl that do not take into consideration cyclists, pedestrians and public transport, to a new paradigm of sustainability, focusing on improving public transport such as bus rapid transit, public transport oriented development, improved freight logistics and intermodal systems, more equitable access, and road space management and design that favours pedestrians and cyclists. These are essential elements in a successful recipe for economic growth and environmental responsibility.

BRT systems are in place in hundreds of cities.

BUS RAPID TRANSIT

More than a hundred cities have developed cost-effective bus rapid transit (BRT) systems as an alternative to more expensive metro and rail infrastructure in order to provide mass transit options at comparable speed and capacities. According to ITDP, on average, BRT systems can be built in a fraction of the time of light rail, cost 30 times less to construct and three times less to operate. The Transmilenio system in Bogota has been registered as a Clean Development Mechanism project that reduces almost 250,000 tonnes of carbon per year. Mexico City already counts, with four BRT lines that move over 700,000 passengers daily, and is planning 13 more lines across the city to move three million in the next five years.

Michael Replogle is Global Policy Director and Founder of ITDP. From 1992-2009, he was Transportation Director at the Environmental Defense Fund. In the past, he has been a consultant to the Asian Development Bank and UNEP, and an adviser to the US Department of Transportation, Singapore Land Transport Authority and the World Economic Forum, among others.

Ramon Cruz is the Climate Policy Manager at ITDP. He was Vice President for Energy and Environment at the Partnership for New York City, a business group, and Senior Policy Analyst for the Environmental Defense Fund. He has been an adviser to the NYC government on energy and solid waste issues and helped develop the City's sustainability plan.

The **Institute for Transportation and Development Policy** (ITDP) works with cities worldwide to bring about sustainable transport solutions that cut greenhouse gas emissions, reduce poverty, and improve the quality of urban life.

ITDP Headquarters
9 East 19th Street, 7th Floor, New York, NY 10003, USA
Tel: +1 212 629 8001 | Fax: +1 646 380 2360
Email: mobility@itdp.org | Web: www.itdp.org

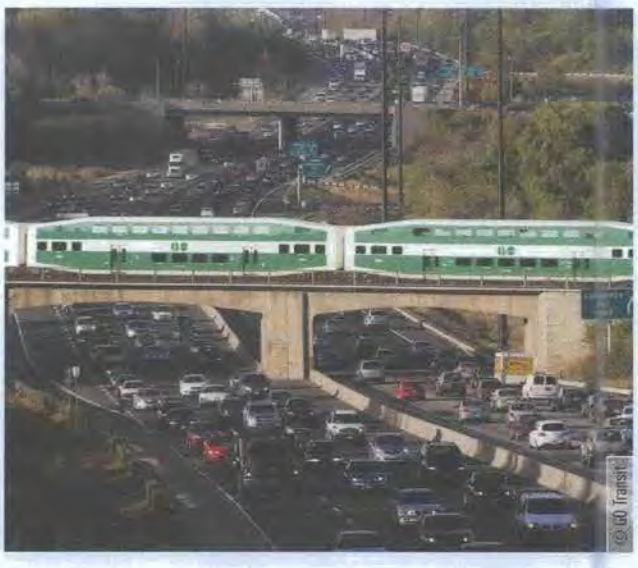
BOMBARDIER

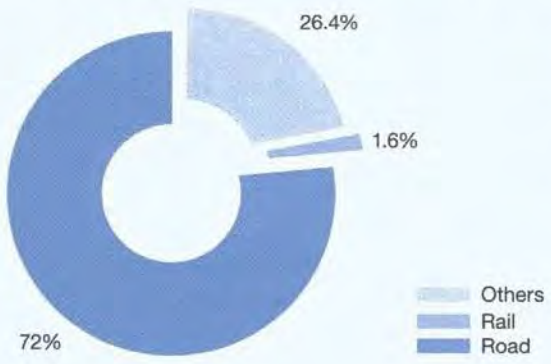
The planet is counting on our action

In times like these, when we are confronted by global economic uncertainty and conflicting political priorities, it is sometimes difficult to see the real, long-term challenges we face – particularly when the impact is not felt immediately. Yet the great challenge which continues to threaten the well-being of not only this generation, but future generations and our entire planet, is the one that often gets dismissed – climate change. Unlike economic developments, the impact of climate change is almost imperceptible to many of us in our daily, busy lives.

The time for argument is past. We have reached a stage where we are forced to face facts. Societies around the world are challenged by rising energy costs, rapid urbanisation and population growth, increasing congestion and pollution. All of these trends are contributing to a relentless increase in global CO_2 and greenhouse gas (GHG) emissions. They are creating growing tension between the increasing need for mobility and the impact of the world's transport systems on environment, competitiveness and quality of life. They present very compelling reasons to change the way we look at the interdependence of transport, economic development and environmental sustainability.

At the heart of this challenge is the relationship between urbanisation and transport, the need to connect people and goods within cities and between cities, while at the same time making a concerted global commitment to reduce emissions. In the year 2000, only a third of the world's population lived in big cities. By 2050, this number is expected to more than double to 70 per cent, according to United Nations estimates. Among these, the number of 'megacities' – huge urban agglomerations with ten million or more citizens – will have risen to 29. In themselves, these megacities will contribute to dramatically increased CO_2 and GHG emissions, requiring increased resources to sustain their industries, businesses, communities and transport networks.





CO_2 emissions of the transportation sector in EU-27

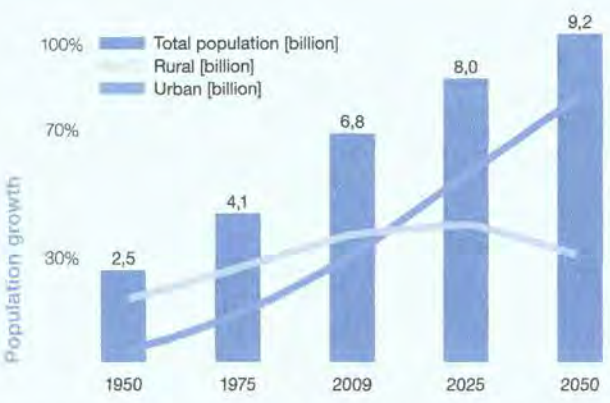
Source: 2005 CO_2 emission figures in EU-27. EC 2007 and UIC Energy/CO_2 database

TRANSPORT AND GLOBAL WARMING

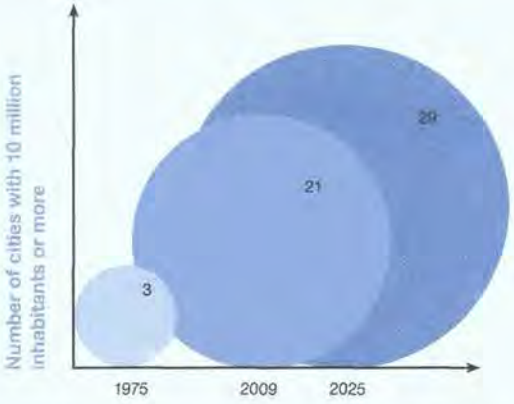
Today, in Europe alone, almost two-thirds of CO_2 emissions caused by transport are road-related. This figure is likely to increase on a global basis, as the populations of the emerging economies become more affluent and more motorised. Nevertheless, the world needs to move. Transport networks are the veins of our planet. They sustain our nations, economies, businesses and culture. Without them, our cities, our nations and our global community would cease to function.

"We have to find a solution now – to keep the world on the move, while at the same reducing transport's CO_2 footprint."

For the past 60 years, road and air have dominated the investment and development decisions of governments, planners and policy-makers. Even today, most of the



United Nations Department of Economic and Social Affairs; Population Division: "World Urbanization Prospects The 2009 Revision"; March 2010



United Nations Department of Economic and Social Affairs; Population Division: "World Urbanization Prospects The 2009 Revision"; March 2010

infrastructure investments and tax exemptions in many cities and countries still go to road and air. Yet, the most environmentally-friendly and energy-efficient mode of mass transport, for people and goods, is rail. Rail is key to helping society reduce its demand for energy. It is a key contributor to economic growth. And, it has a considerable and positive influence on the urban environment, in particular on land use, traffic congestion, pollution and quality of life. Growing cities need the space- and eco-efficient transport solutions offered by rail.

A MODAL SHIFT

The time has come to rethink our transport decisions as part of a low carbon future for the planet, for people and for the cities in which we live. We need new approaches at every level, that work together to encourage truly integrated transport networks, that ease interconnectivity and proactively rebalance the three major modes of transport – air, road *and* rail – to conserve energy, limit congestion and reduce pollution. Rail needs to play a bigger part in the equation. Culturally, collectively, individually, politically and economically there are strong reasons to demand increased investment in rail transit solutions.

Trains of today are the modern machines of the 21st century. In service around the world, they offer aerodynamic efficiency, high speeds, increased comfort, higher capacity, convenience and beautiful design. They are highly passenger-oriented and can incorporate the latest technology for information and internet access. The latest trams, metros, monorails and rapid transit systems move people safely, quickly and efficiently into and around cities, reducing congestion and pollution, and helping cities breathe again.

At Bombardier Transportation we love our business, not least because our technology is helping to define the future of mobility. We are working to make our products even better. We lead the industry in our pioneering Bombardier ECO4 technologies, which balance the four cornerstones of sustainable mobility – energy, efficiency, economy and ecology. These technologies can help reduce overall energy consumption of trains by 50 per cent and can go a long way to significantly reduce the total carbon footprint of transport.

Our Zefiro family of very high-speed and high-speed trains has also set a new benchmark in environmental performance in the area of long distance rail travel.

By creating comfortable high-speed rail vehicles with the latest onboard technology for work and entertainment, we are encouraging people to leave their cars at home and exchange congested roads for a relaxing journey by train. This type of modal shift in consumer behaviour for regional commuting will make a real difference to transport-related carbon emissions.

Urban congestion is becoming an increasing challenge, one that we are tackling head-on with our 'Smart Transport Solutions'. A look at our website will show you some of the exciting developments that we are putting forward today to help shape urban transport planning and transform the experience of commuters. Such innovations include our PrimoveCity solution, a groundbreaking approach to electrical mobility in cities encompassing car and bus applications, enabling them to travel quietly and – most importantly – without emissions.

“We can encourage people to leave their cars at home.”

The planet is counting on our action. All of us – policy-makers, international associations, academic institutions, industrial enterprises, businesses and citizens alike – can make decisions today that will enhance the well-being of our society and the planet we all share. We all have the power to make a positive difference towards a more sustainable world. At Bombardier Transportation we continue to push the boundaries on sustainable mobility, making it a reality today and not simply a vision for tomorrow.

Sharon Christians
Vice President Communications and Public Affairs
Bombardier Transportation

Web: www.transportation.bombardier.com

Sustainable energy efficiency in buildings

© Matthew G. Bisanz

Buildings offer a huge opportunity for carbon emissions reduction.

By **Curt Garrigan**, Coordinator, UNEP Sustainable Buildings and Climate Initiative (UNEP-SBCI)

The case for building energy efficiency is well known and well established. Buildings offer governments, at all levels, the greatest potential for reducing greenhouse gas (GHG) emissions at the least cost, while creating jobs and improving energy security. Policy-makers, however, must take action now to establish baselines, prioritise energy efficiency policies, and avoid locking-in carbon intensive building stocks for decades to come. Buildings use approximately 40 per cent of global energy, 25 per cent of global water, 40 per cent of global resources, and they emit about one-third of all anthropogenic GHG emissions. Yet, buildings also offer the greatest potential for achieving significant GHG emission reductions, at least cost, in developed and developing countries. Furthermore, energy consumption in buildings can be reduced by 30 to 80 per cent using proven and commercially available technologies, which also generate significant savings and reduces operating costs.

Achieving energy efficiency from buildings requires local and national governments to focus on a wide array of issues, from specific technological or design changes, policy and enforcement actions, information management to education, and capacity building. Specific technical recommendations will vary depending on geographic and climatic conditions, as well as the availability of expertise, materials and equipment. Governments can play a key role in increasing market penetration of new and relevant technologies when they lead by example and direct that all new public buildings meet stringent energy efficiency criteria. Local government can also require existing public buildings to undergo energy efficiency retrofits or, at a minimum, encourage energy audits to identify energy efficiency opportunities in public facilities such as public housing, fire or health facilities, and municipal government buildings.

THE COMMON CARBON METRIC

Before working to increase energy efficiency and the performance of buildings it is helpful to understand the current energy use of a building stock. One important tool for assessing a city's current baseline energy use is UNEP-SBCI's globally applicable Common Carbon Metric. The Commons Carbon Metric (CCM), provides industry, businesses and governments with a globally-consistent methodology to establish baselines of performance for buildings. The CCM is not a rating tool; it only provides a method to measure energy use and GHG emissions in a consistent manner worldwide. The CCM is accompanied by a protocol for measurement and a tool for calculation and reporting. The tool is a simple Excel spreadsheet that can be filled in by participants with the appropriate data, whether it is estimated or measured.

The tool can be used for two types of measurement approaches:

- The first approach is top-down (or building-stock): the participant inputs data for a stock of buildings (which can be a city/community stock, or a portfolio of buildings for instance). The stock is composed of different types of buildings (residential, commercial) with different performance levels. This approach allows measuring the energy use and GHG emissions for the whole stock. This data will then be disaggregated according to the type of buildings (residential and commercial at a minimum, and if possible more detailed, e.g. single-family and multi-family residential, retail, schools, offices, hospitals, etc.).
- The other approach is bottom-up (or single-building): participants input data separately for each of the buildings being assessed. By measuring representative buildings of each category, the data can then be extrapolated to the stock of buildings. This approach was originally aimed at verifying the results of the building-stock approach, by conducting a measurement for a representative sample.

The importance of the CCM is that it allows local governments, and other organisations, to transparently keep track of progress and to identify sectors or specific buildings that require special attention.

CODES AND STANDARDS

Once a baseline has been established there are a number of possible approaches for pursuing energy efficiency improvements; analysis and research by UNEP-SBCI, however, has shown that the most cost-effective and economically beneficial steps a city or local government can take to encourage the adoption of energy efficiency is the establishment of building codes and minimum design standards. Regulatory statues such as building codes provide for the greatest reduction in energy use at the least financial cost, while at the same time increasing employment and improving the disposable income available to residents.

Building codes and other regulatory tools are not a panacea and must also be tied directly to code enforcement, education and capacity building. In order to propagate a new technology or building technique, the building professionals involved must be able to actually apply them. In this regard experts have listed the following training needs for the development of personnel to certify a building's performance:

- Qualification of raters;
- Development of a code of standards for the field and performance testing verification;
- Definition of quality assurance requirements; and
- Definition of insurance requirements.

Today, many governments have agencies and staff dedicated to the promotion of energy efficiency. According to a survey of 70 countries conducted by the World Energy Council and the French Environment and Energy Management Agency (ADEME) in 2008, about two-thirds of the countries surveyed had a national energy efficiency agency and over 90 per cent had a ministry or department dedicated to energy efficiency. The European Union has even created an 'Intelligent Energy Europe' agency to manage energy efficiency projects, including for buildings, and supported the creation of local and regional energy efficiency agencies. These agencies often play a co-ordinating role to facilitate consultative processes and communication between stakeholders, including between different branches of the government itself.

EDUCATING THE NEXT GENERATION

In addition to ensuring that the relevant city or national agencies have trained staff that can review, support, and lead the initiative for more energy efficient buildings; it is also incredibly important for cities and governments to train and educate the next generation of residents. Education for sustainable buildings and energy efficiency can help ensure the ongoing success of these important efforts. UNEP-SBCI's *Guidelines on Education Policy for Sustainable Built Environments* lists a handful of helpful guidelines for local and national governments. Namely, that government at all levels must ensure that innovative projects become learning opportunities by documenting them as case studies and through performance monitoring. Governments can also educate the private sector in the value of sustainable development strategies by supporting sustainability performance rating schemes for buildings, rewarding best practice, and assisting the mainstreaming of sustainable building through establishing communities of practice supported by information technology. These communities of practice can help support the review and reform of the school curriculum to ensure that sustainable building education is a core component. These initiatives allow the private and public sectors to share knowledge and educate each other about energy efficiency and building sustainably on a project-by-project basis.

"Government at all levels must ensure that innovative projects become learning opportunities by documenting them as case studies."

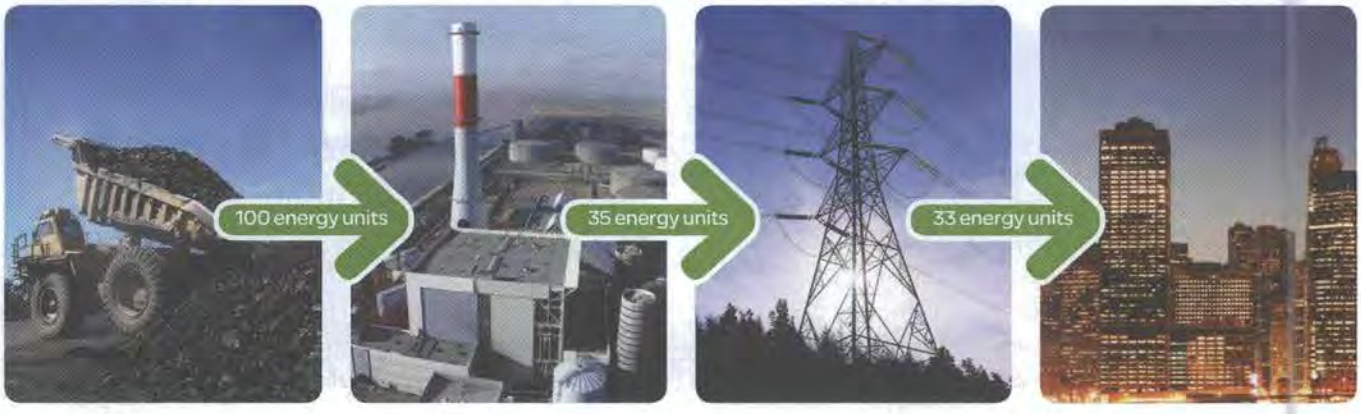
It is when local and national governments lead by example, utilising public procurement to drive the adoption of more efficient technologies, mandating energy efficiency through building codes, and designing standards and educating the designers of today and the residents of tomorrow, that the broad adoption of energy efficiency in buildings can be assured, and strong action can be taken to combat global climate change.

Curt Garrigan has served since 2010 as the Coordinator of the United Nations Environment Programme's Sustainable Buildings and Climate Initiative (UNEP-SBCI) in Paris, France. Before joining UNEP, he served in a number of capacities for the city government in Nashville, Tennessee, including Deputy Mayor, where he co-ordinated municipal policies and initiatives and assisted in developing the city's US$1.5 billion budget. He led master planning and facilities development for the city's Parks Department and implemented a $150 million capital plan. He had previously been Assistant Director of the city's Historical Commission. Following Nashville's historic flood, he was appointed by the city's mayor to co-ordinate planning and infrastructure for the city's post-disaster recovery team.

The **United Nations Environment Programme's Sustainable Buildings and Climate Initiative** (UNEP-SBCI) works to promote sustainable building practices worldwide. This is a joint effort with key stakeholders in this sector (industry, businesses, governments, local authorities, research institutions, academia, experts and NGOs).

Sustainable Buildings and Climate Initiative Secretariat
United Nations Environment Programme – DTIE
15 rue de Milan, 75441 Paris cedex 09, France
Tel: +33 1 44 37 14 31 | Fax: +33 1 44 37 14 74
Email: sbci@unep.org | Web: www.unep.org/sbci

The only good watt is a negawatt



Due to intrinsic inefficiencies, 33 units of energy consumed at the point of use require 100 units of primary energy

What's a negawatt? The one you didn't use

Energy saved is money saved

Yes, the smart grid is coming and we are actively implementing intelligence and innovations to help make it a reality. But we need a solution that will save energy and drive efficiency today as we are building the smarter grids of tomorrow.

Introducing EcoStruxure: Active Energy Management Architecture from Power Plant to Plug™

Right now, EcoStruxure solutions from Schneider Electric™ can reduce your energy use by up to 30% while cutting capital and operational costs. End-use efficiency is where our focus needs to be! The percentage of revenue spent on energy by companies could reach 30% by 2020. And there is an urgent need to reduce CO_2 emissions, especially as energy demand escalates. Energy management is the key – the fastest and most effective solution to curb greenhouse gas emissions while improving business performance. In fact, by 2030, energy efficiency and behaviour change will offset more CO_2 than all the new wind, solar, and other alternative energy generation methods combined.*

EcoStruxure

EcoStruxure solutions cut energy costs today

As energy prices continue to climb, every unit of energy you save matters. One unit saved at the point of use means three units of primary energy not consumed. Today, only EcoStruxure Active Energy Management architecture can deliver up to 30% energy savings across your buildings, industrial plants, and data centres. You deserve an Efficient Enterprise™!

Get smarter about energy

Download this White Paper, 'Growing a Green Corporation', a €170 value, for FREE, and register to win an iPad!

Visit www.SEreply.com Key Code 11349P
Call 1 401 398 8560 or 800-789-7038

Schneider Electric

*Source: World Energy Outlook 2009, IEA/OECD

Schneider Electric

Smarter cities – more efficient, sustainable and liveable

Tomorrow's smart cities.

The figures are well known but arresting. Cities today cover two per cent of the earth's surface, contain 50 per cent of the world's population, consume 75 per cent of global energy and give off 80 per cent of greenhouse gas emissions.

And cities are growing: by 2050, they will be home to 70 per cent of the people in the world. This means that over the next 40 years we need to provide new urban capacity equivalent to that of the past 4,000 years.

As the world wonders how to meet the challenge of the growing demand for energy and resources, while drastically reducing global carbon emissions, one thing is clear: this challenge will be won, or lost, in the cities. And the word 'challenge' suddenly seems inadequate.

Cities today, all over the world, are plagued with congestion, sprawl, power shortages, lack of water, unaffordable public services and many other urban ills. To retain or regain their attractiveness and competitiveness – to survive – cities need to become *smarter*: more efficient, more sustainable, more liveable.

THE SOLUTIONS EXIST

Cities are a complex value chain, involving not just local governments and inhabitants, but local business, utilities, real estate developers and managers, as well as investors.

As cities embark on their journey to 'smart', whether because they will play host to a major event, need to expand, want to relieve pain points or in general plan their future, they need to bring in all stakeholders, including the private sector, from the start.

The solutions exist. What is key is having all stakeholders work together to bring in the best solutions and combine them, collaborating across sectors, to ensure cost-effectiveness and compliance and funding over time.

At Schneider Electric, we deliver efficient and sustainable urban infrastructures.

We provide innovative, expert solutions in smart grid, smart mobility, smart water, smart buildings and homes, smart public services.

We tailor our solutions to cities' unique needs.

We bring recognised integration capabilities.

And we collaborate with other best-in-class players.

We know what it takes. We help make it happen.

Web: www.schneider-electric.com

raízen

A strategic approach to sustainable development

Raízen, a joint venture between Shell and Cosan, the world's largest sugarcane producer, was born in 2011 with the mission to offer solutions in sustainable energy and to provide a relevant contribution to society. As such, it strategically furthers the sustainability actions of its founders. With 24 sugar and ethanol mills, Raízen manages over 700,000 hectares, has a distribution capacity of 22 billion litres per year and over 40,000 employees. It is the fifth largest Brazilian corporation and generates enough electricity to supply a city as large as Rio de Janeiro. With such figures, Raízen has the responsibility of being effective in its sustainable development strategy.

There is no question that sugarcane-based ethanol is an excellent fuel, both because of its environmental benefits and of the way it requires only small adjustments to fit the current transport system infrastructure.

Raízen uses ways to make the sugarcane-to-ethanol process more efficient. From cultivation to use, sugarcane ethanol produces around 70 per cent less CO_2 than conventional petrol, taking into account factors such as transport and processing. As it grows, sugarcane generally absorbs CO_2 at a greater rate than other biofuel crops.

The approach it takes also reduces CO_2 emissions in other ways. For instance, Raízen turns by-products into natural fertilisers for sugarcane: nutrient-rich crumbly solids, left from filtering the juice after the sugarcane is crushed in the mills, and a liquid known as vinasse, left when the ethanol is distilled. Raízen also burns leftover plant fibres, known as bagasse, to power its mills. Excess power is supplied to the national grid.

Electricity from bagasse in the ethanol industry already meets three per cent of Brazil's demand, and this is expected to rise to 15 per cent by 2020. At two of Raízen's mills, hot water is used to extract the sugarcane juice, rather than on squeezing it out with rollers. Chopped cane moves on a covered conveyor belt as hot water is pumped in. The water naturally draws the juice out of the cane. More juice is extracted than in the conventional process and the bagasse is drier, making it easier to burn for electricity.

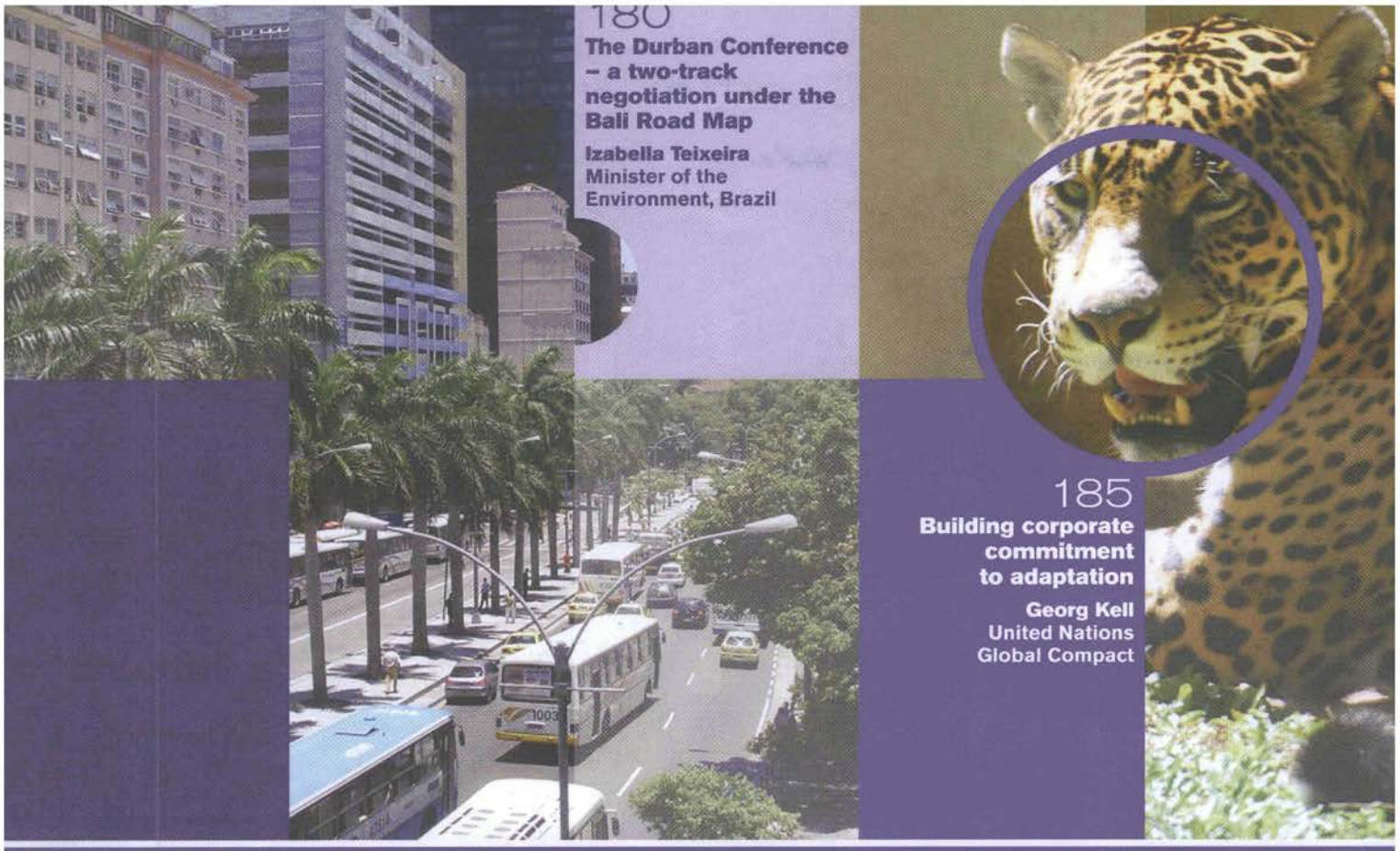
Over the coming years, some plant waste from the sugarcane ethanol process could potentially go into making advanced biofuels. In one process enzymes break down the cellulose in plant fibres to produce ethanol. Raízen has the potential to help accelerate the commercial production of biofuels from crop waste and inedible plants.

For the energy industry, CO_2 management and reduction is one of the chief concerns and the focus of much research and investment. Low-carbon biofuels will be the most practical and commercially realistic way to take CO_2 out of transport fuel in the coming years and will be a vital part of the future energy mix, which will one day be less dependent on fossil fuels. In this context, it is important to advance technology and improve farming methods in order to boost sugarcane productivity over the next decades.

Raízen is determined to implement a cohesive and strategic agenda, based on long-term guidelines, in order to contribute to a greener and more sustainable energy matrix. Every move impels the company towards compliance with overarching sustainability principles and, while moving forward, every step must be strategic for the business. This in itself brings the whole value chain along.

We at Raízen are committed to contributing to a greener society by improving the sustainability of our operations. Our goal is to be sustainably profitable and thus generate a better future.

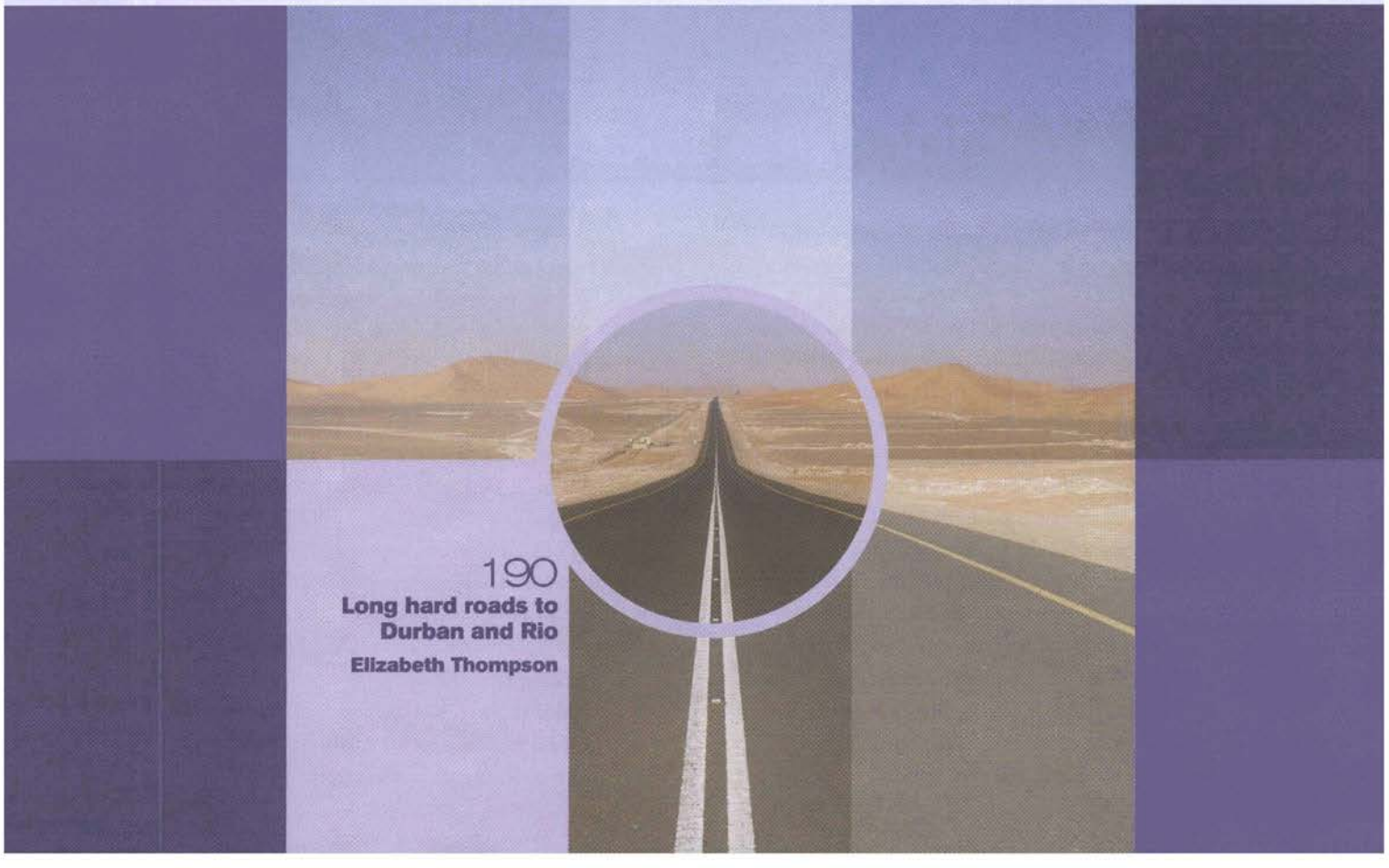
Luiz Eduardo Fróes do Amaral Osorio
Vice President of Sustainable Development and External Affairs
Raízen
Email: luiz.osorio@raizen.com



180
The Durban Conference – a two-track negotiation under the Bali Road Map
Izabella Teixeira
Minister of the Environment, Brazil

185
Building corporate commitment to adaptation
Georg Kell
United Nations Global Compact

THE ROAD TO RIO



190
Long hard roads to Durban and Rio
Elizabeth Thompson

Minister photo: © Jefferson Rudy/MMA © Rinna Carol

Avenida, Rio de Janeiro.

The Durban conference – a two-track negotiation under the Bali Road Map

By **Izabella Teixeira**, Minister of the Environment, Brazil

In 2007, during the thirteenth United Nations Climate Change Conference (COP13), the parties of UNFCCC agreed on the Bali Road Map, which is based on two formal negotiation tracks, so called AWGs: the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (known as AWG-KP), established in December 2005 under the first Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP1), and the Ad Hoc Working Group on Long-term Co-operative Action under the Convention (known as AWG-LCA), established in December 2007 under COP13. These AWGs have been the instruments for the two negotiation tracks up to now as confirmed at the last COP in Cancun: the AWG-KP is the track on Further Commitments for Annex I Parties under the *Kyoto Protocol* and the AWG-LCA is the *Convention* track.

The AWG-LCA has been working to implement the Bali Action Plan, in a process to enable the full, effective and sustained implementation of the UNFCCC through long-term co-operative action, now, up to and beyond 2012. The AWG was created to complete its work in 2009 and should have presented the outcome of its work to the Conference of the Parties for adoption at its fifteenth session, in Copenhagen.

The COP decided to extend the AWG-LCA after COP15 and COP16. In Cancun, the mandate was extended for one year, in order for the group to continue its work with a view to carrying out the undertakings contained in the Cancun Decision, consider issues still to be concluded and complete an agreed outcome.

In regard to AWG KP, the COP agreed that the AWG should aim to complete its work pursuant to decision 1/CMP.1 and have its results adopted by the Conference of the Parties serving as the meeting of the Parties to the

Kyoto Protocol (CMP) as early as possible and in time to ensure that there is no gap between the first and second commitment periods.

CHANGE THE BALI ROAD MAP? OUT OF THE QUESTION

Durban will be crucial to the Kyoto Protocol, taking into account that the first commitment period expires in 2012. If Parties fail to define further commitments for Annex I Parties under the Kyoto Protocol there will be a gap that could undermine this rules-based instrument. In addition, the COP and CMP in Durban will be the first major conferences ather parties adopted the Cancun Agreements, which renewed trust in the multilateral process. We will therefore also be challenged to make these agreements operational.

> **“The challenge now is to make these agreements operational.”**

The success of the Durban Conference depends on the parties' constructive work, based on the agreement and commitments currently in place. Unfortunately there are some strange messages suggesting another unacceptable goal.

The Bali Road Map had been agreed in order to enhance action, respecting common but differentiated responsibilities, while ensuring the comparability of efforts among developed country parties. However, contrary to what was agreed under the Bali Road Map, some countries have expressed preference for a new model of international regime on climate change, based on only one new track. This is not in line with the process agreed four years ago. Something like that could represent a very dangerous new approach, which could undermine the multilateral rules and institutions that have been created over the past fourteen years. Other countries still would like to preserve a rules-based international regime, but not exactly the existing Kyoto Protocol. In a nutshell, these countries are in favour of all big economies committing to reduce greenhouse gas emissions based on quantified targets, similarly to the model that today is applicable to developed countries. Meanwhile, another group of countries are opposing Kyoto focused on the idea that all parties, developed or developing countries, could unilaterally define their mitigation actions, based on an approach similar to and originally thought out for developing countries under the Bali Action Plan.

There are countries who have expressed the intention of moving away from Kyoto to present mitigation pledges under the Convention track. It is difficult to accept that a country is abandoning Kyoto in order to do more.

POLITICALLY RELEVANT TECHNICAL ISSUES

The Government of Brazil continues to work with a view to ensure a second commitment period for Annex I Parties under the Kyoto Protocol and to implement the Cancun Agreements. It simply intends to implement the road map that has been agreed four years ago. The biggest challenge is to make this scenario politically feasible, in order to make it operational from a technical basis. The AWG-KP has been able to achieve a technical negotiation document which is a

Rio de Janeiro's night skyline seen from the Sugarloaf.

© Mark Goble

good basis for the negotiations in Durban. Technical issues like emissions trading and Kyoto Protocol mechanisms are on a good track. Measures to reduce greenhouse gas emissions and to enhance sinks resulting from anthropogenic land use, land use change and forestry activities shall continue to be available to Annex I Parties as a means to reach their quantified emission limitation and reduction objectives.

Although the negotiation text represented a good way forward, the Clean Development Mechanism (CDM) depends on the Kyoto Protocol because it is based on legally binding targets for Annex I Parties who demanded that the Certified Emission Reductions result from the Mechanism. CDM will not make sense in the absence of the Protocol. The continuation of the flexibility mechanisms of the Kyoto Protocol, in particular the Clean Development Mechanism (CDM), is contingent upon the establishment of quantified emission reduction commitments by Annex I Parties under the second commitment period.

"Technical issues like emissions trading and Kyoto Protocol mechanisms are on a good track."

Under the AWG LCA the success of Durban Conference is related to the parties' capacity to make operational the forty paragraphs on modalities and procedures or working plans contained in the Cancun Decision. Parties must work to enable the early operating status of all the institutions agreed to in Cancun, including:

- The registry for nationally appropriate mitigation actions and international support;
- The Adaptation Committee;
- The Technology Executive Committee, Centre and Network; and
- The Green Climate Fund, which must provide significant means of implementation for immediate action to tackle climate change.

The importance must be stressed of ensuring an appropriate overview of the Green Climate Fund by COP, in order to ensure its adequate management and timely disbursements to developing countries.

Detailed and comprehensive information on fast-start financial flows provided by developed countries should be made available officially. This is a fundamental requirement for dealing with UNFCCC's implementation deficit regarding the financing building block under the Bali Action Plan.

We are in a new context for rigorous, robust and transparent accounting of finance taking into account that a quantified commitment for finance has been established for the first time. The assessment of progress in achieving the financial targets is crucial, but the existing reporting requirements under the Convention for developed countries to report on finance must be enhanced significantly. An enhanced common reporting format for financing, as well as enhanced information on measurable, reportable and verifiable mitigation actions and corresponding support should be considered in Durban.

In Durban, the discussions on measuring, reporting and verifying Annex I mitigation should be based on the development of a common accounting framework and rules, taking the rules of the Kyoto Protocol as the reference. There is a need for ensuring transparency and comparability of mitigation commitments by all developed countries. The revision of guidelines on the reporting of Annex I National Communications should cover supplementary information on achievement of quantified economy-wide emission reduction targets.

THE BALI ROAD MAP SUPPORTING THE DURBAN OUTCOME

Brazil will spare no efforts to reach an agreement on a second commitment period to the Kyoto Protocol, which is the single most important rules-based system, preserving the top-down legal structure created by the Protocol with the institutions that have been created over the past fourteen years.

Aware of the fact that a second commitment period alone is not an option for some parties, progress on the Kyoto Protocol side together with progress on the UNFCCC side is crucial for the negotiation to move forward in a successful way. Achieving a comprehensive, balanced and ambitious outcome in Durban means implementing the Bali Road Map, which has been agreed based on the multilateral response to climate change in the context of sustainable development and in accordance with the provisions and principles of the Convention, in particular the principle of common but differentiated responsibilities and respective capabilities.

Brazil envisages the Durban Conference as a relevant step to ensure the full, effective and sustained implementation of the UNFCCC and its Kyoto Protocol, as well as a clear signal for the international community that multilateralism can and shall be reinforced.

Izabella Teixeira has been Minister of the Environment, Brazil, since April 2010. Born in Brasília, Izabella Teixeira is a biologist and holds a Master's Degree in Energy Planning and a Ph.D in Environmental Planning at COPPE/UFRJ. A civil servant at the Brazilian Environmental Agency since 1984, she is an expert in strategic environmental assessment, and has occupied different management positions at the Agency, as well as at the Ministry of the Environment and at the State Government of Rio de Janeiro. From 2007 to 2008, Izabella Teixeira was the Vice-Secretary of the Environment at the State Government of Rio de Janeiro, until she was nominated for the position of Vice-Minister of the Environment in Brazil.

Esplanada dos Ministérios
Bloco "B", 5 andar, sala 532, Brasilia, DF Brasil 70068-900
Tel: +55 61 2028-1416 | Fax: +55 61 2028-1983
Email: asin@mma.gov.br

CEMIG

Way ahead in clean energy

Cemig's electricity comes mainly from renewable sources. And it invests further in diversification and the quality of its services, expanding its business with a focus on clean energy. In 2010, 99 per cent of the energy that Cemig generated came from renewable sources: hydroelectric power, wind power, and co-generation in projects with industry.

Now in its 59th year of operation, Cemig is one of the largest and most important electricity concession holders in Brazil. It is the leader of a conglomerate of 98 companies and 15 consortia, operating in generation, transmission and distribution of electricity, and in provision of other services such as natural gas distribution, data transmission and the energy solutions offered by its energy service company. In 2010, Cemig acquired a holding in Renova Energia, a wind power generation company which also operates small hydro plants.

Cemig has operations and businesses in 23 of Brazil's states, and a transmission line in Chile. It is both Brazil's and Latin America's largest electricity distribution company, the third largest in electricity generation, and the second largest in transmission. It has approximately 110,000 shareholders, in 44 countries. Its share securities are traded on the stock exchanges of São Paulo, New York and Madrid.

"In 2010, 99 per cent of the energy that Cemig generated came from renewable sources: hydroelectric power, wind power, and co-generation in projects with industry."

Important progress has been made by the group in reaffirming its commitment to climate change. In 2010, Cemig was selected for inclusion in the ICO_2 Efficient Carbon Index, organised by the São Paulo Stock Exchange (BM&F Bovespa) and the Brazilian Development Bank (BNDES). The ICO_2 is based on the ratio of companies' greenhouse gas emissions to their net sales revenue – showing the financial markets that Brazilian companies are preparing for a low-carbon economy.

Cemig already has projects that offer large-scale electricity from new energy sources. To develop them, it has a strategy of anticipating and developing technology through partnerships with universities, public institutions and research centres, covering the whole of a project from development of the pilot operation to commercial-scale implementation.

NEW SOURCES

Wind energy. With its connection of the country's first wind power plant to the electricity system, Cemig was the pioneer of wind energy in Brazil. It has progressed in wind power with the acquisition of 49 per cent of a 99.6MW wind farm in Brazil's north-east. This project avoids emissions into the atmosphere of about 146,000 tonnes of CO_2. Cemig has also created the Wind Power Atlas of Minas Gerais, which indicates an estimated potential of 40GW of wind power generation in the state.

Solar energy. Cemig is building a 3MW photovoltaic solar energy plant to be connected to the national grid, in partnership with a company in the sector – this will be one of the largest photovoltaic plants connected to the grid.

Biomass. Cemig has projects for the connection of sugar and alcohol plants to its electricity system, in which electricity will be company-generated from sugar cane bagasse (a waste product in sugar production) – increasing the contribution of renewable sources to Brazil's energy supply.

Energy from landfill gas. Cemig is selling electricity generated from biogas – composed of methane and CO_2 – produced by decomposition of garbage from a landfill. With this initiative Cemig again shows the way forward in providing its clients with electricity from sustainable sources.

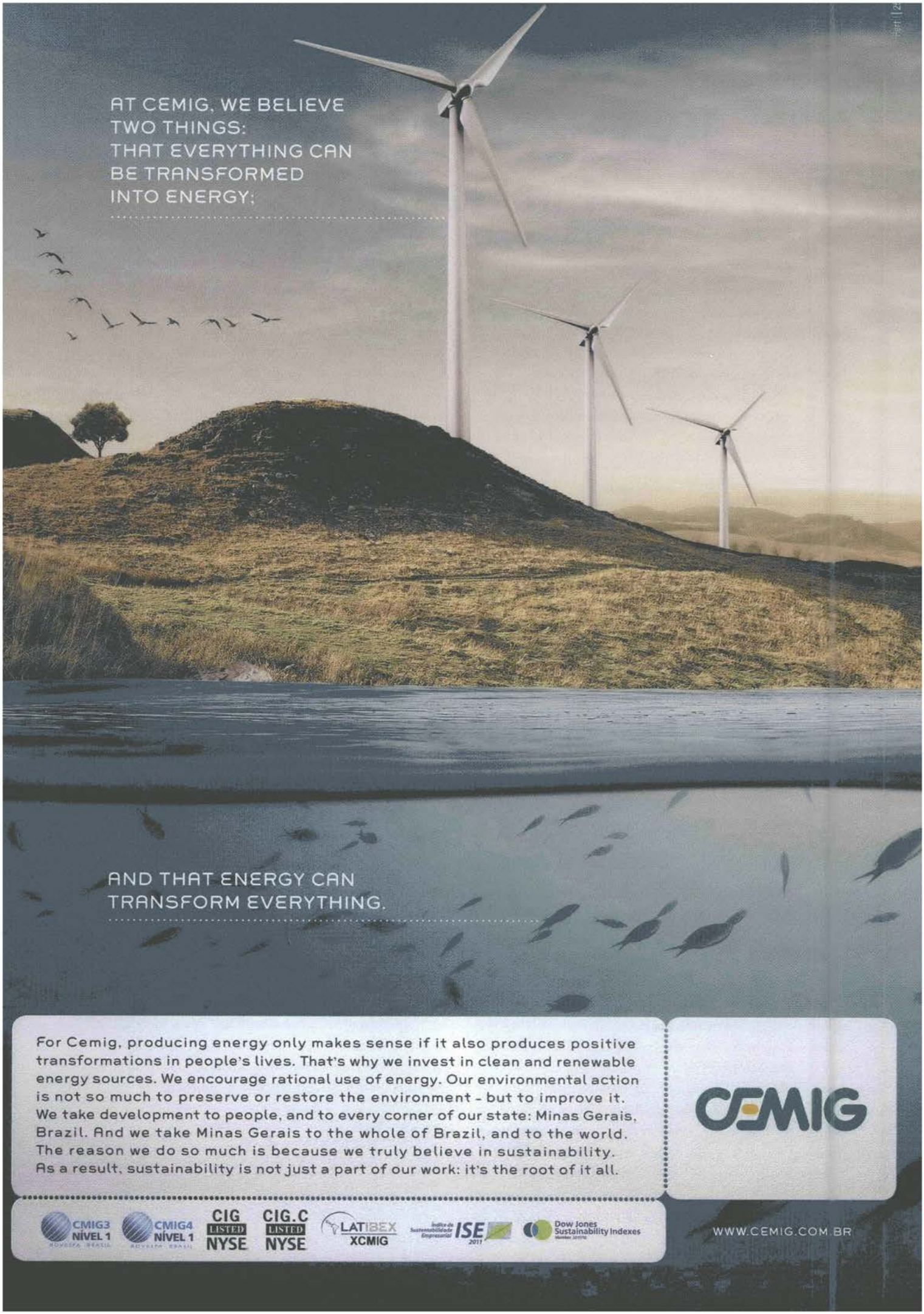
Electric vehicles. Cemig has electric vehicles in its fleet, testing the operational and maintenance specifics of this technology, and participates in an electric vehicle R&D project.

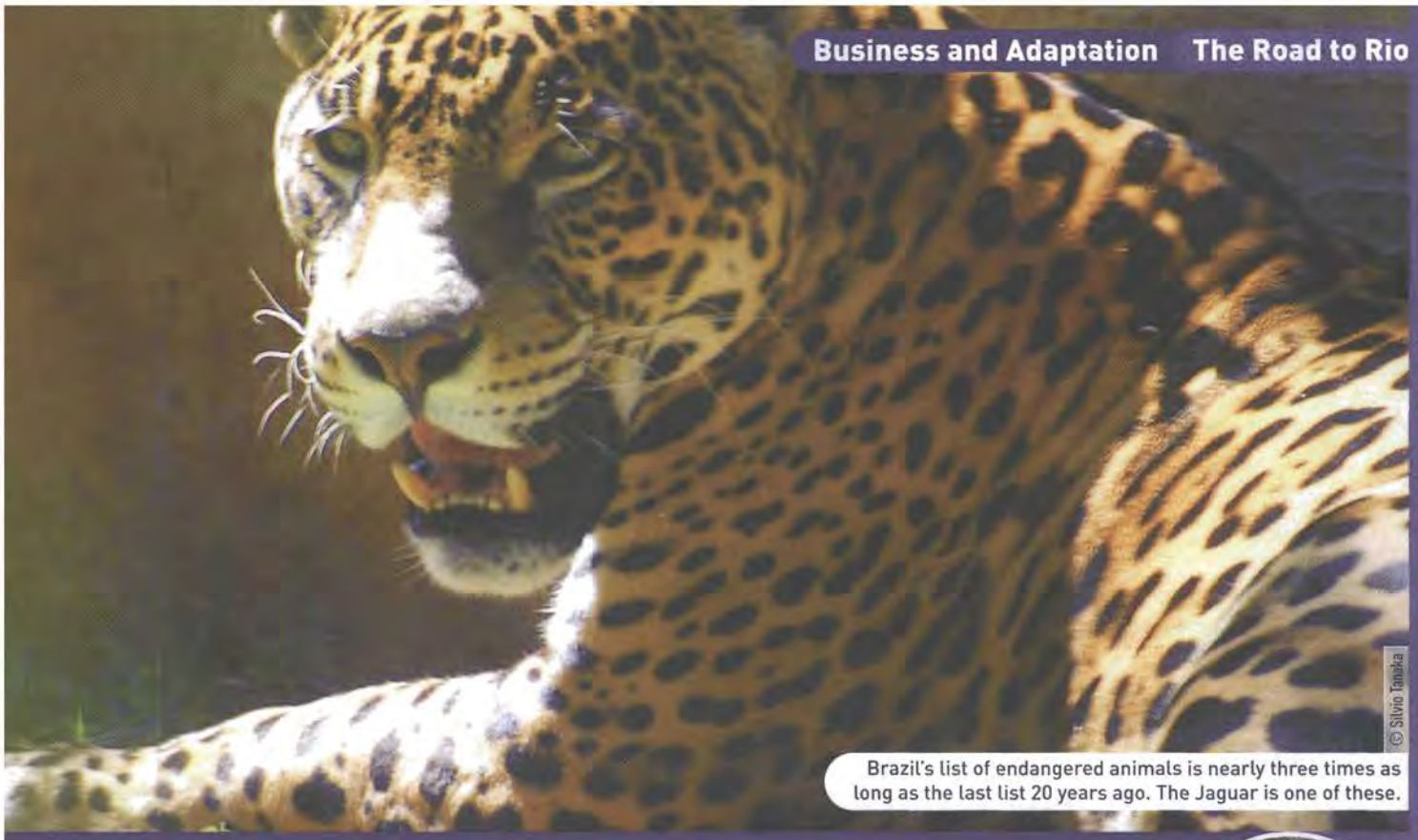
ACTIONS ON CLIMATE CHANGE

As well as investments in alternative energy sources, Cemig offers services to improve the efficiency of energy use by its residential, commercial and industrial clients, contributing to a reduction of greenhouse gas emissions. In 2010 these services led to reductions of 71,333 MWh/year in electricity consumption, corresponding to an avoidance of emissions of 3,633 tons of CO_2 and greenhouse gases. The electricity saved is enough to supply approximately 50,000 homes.

All the risks and opportunities related to climate change are listed in the Carbon Disclosure Project (CDP).

Tel: +55 313 506 4020
Web: www.cemig.com.br


AT CEMIG, WE BELIEVE
TWO THINGS:
THAT EVERYTHING CAN
BE TRANSFORMED
INTO ENERGY;
AND THAT ENERGY CAN
TRANSFORM EVERYTHING.
For Cemig, producing energy only makes sense if it also produces positive transformations in people's lives. That's why we invest in clean and renewable energy sources. We encourage rational use of energy. Our environmental action is not so much to preserve or restore the environment - but to improve it. We take development to people, and to every corner of our state: Minas Gerais, Brazil. And we take Minas Gerais to the whole of Brazil, and to the world. The reason we do so much is because we truly believe in sustainability. As a result, sustainability is not just a part of our work: it's the root of it all.
CEMIG
CMIG3 NÍVEL 1
CMIG4 NÍVEL 1
CIG LISTED NYSE
CIG.C LISTED NYSE
LATIBEX XCMIG
ISE 2011
Dow Jones Sustainability Indexes
WWW.CEMIG.COM.BR



© Silvio Tanaka

Brazil's list of endangered animals is nearly three times as long as the last list 20 years ago. The Jaguar is one of these.

Building corporate commitment to adaptation

By **Georg Kell**, Executive Director, United Nations Global Compact

More than perhaps any other global challenge, climate change is impacting business around the world – directly and indirectly. Already, changing climate hinders and complicates economic development, disrupts food and water supplies, and threatens peace, stability and social cohesion. Much of the debate so far has focused on the necessary commitments and efforts to reduce global greenhouse gas emissions. But it has become increasingly clear that companies must equally build climate resilience and develop adaptation strategies that counter current and future impacts caused by climate change. This is particularly relevant in developing and emerging countries, where the contrasts between ambitious long-term growth projections and extreme climate vulnerability could not be any greater.

Rising seawater levels, loss of biodiversity, water shortages and flooding are just some of the direct climate impacts disrupting markets and societies everywhere. From here, it is not hard to imagine dramatic, yet no less realistic socio-economic impacts, ranging from widespread poverty to civil unrest, armed conflict and even failing states. Thankfully, many companies are already confronting the costs of these impacts. However, comprehensive strategic responses remain an exception, and too many businesses continue to sit on the fence.

Even as an increasing number of companies acknowledge being directly affected by physical or market impacts of climate change, few have learned to assess material climate risks and seize opportunities which would ultimately not only avert disaster and avoid costs, but build and strengthen competitive advantage.

SECTOR-WIDE RESPONSES

On the positive side, some sectors have been far more proactive in recognising and acting upon the need for adaptation than others. Quite understandably, the insurance sector has taken a leading role. German insurer Allianz puts the industry's worldwide losses linked to climate change at a staggering US$41 billion per year between 2010 and 2019, and European insurers in particular have early on taken the initiative to recognise and address climate change as a material challenge to their long-term viability. Munich Re, a German-based global reinsurer, launched its Munich Climate Insurance Initiative as early as 2005 to support developing countries' adaptation efforts through innovative risk-management tools.

Nevertheless, the business-wide response does not adequately reflect the massive scale of the challenge. Neither has business done enough to identify opportunities resulting from climate change, such as gauging demand for new

products and services. There is no doubt that against this rapidly evolving backdrop shifting risks and opportunities, competitiveness and successful adaptation will be two sides of the same coin.

For those that take the challenge at hand seriously, adaptation efforts must begin with a careful assessment of their own vulnerabilities in order to build resilience within their operations and their supply chain. And while uncertainties about precise long-term climate impacts remain, they should not prevent companies from taking action. Many of these actions, such as improved management of natural resources, will benefit both the company and communities and ecosystems, which is why they are often referred to as 'low-regret' measures. For instance, companies can help their suppliers understand and manage climate risk and facilitate their access to information, equipment, and technology to help them withstand climate shocks.

“For those that take the challenge at hand seriously, adaptation efforts must begin with a careful assessment of their own vulnerabilities in order to build resilience within their operations and their supply chain.”

Another option is sourcing from small and medium-sized enterprises, which creates local jobs and strengthens the overall economic base of local communities – and thus their resilience to crises.

INNOVATIVE EMPLOYMENT

Much has been written and said lately about the potential for green jobs that seek to reduce harmful greenhouse gas emissions, such as those in the renewable energy and green building industries. By comparison, jobs that also build resilience to the impacts of climate change have received far less attention. By innovating products and services that address critical adaptation needs, the private sector can create true business value while helping communities to adapt. Building preparedness for climate change through investments in adaptation can trigger new and expanded economic activity, supporting both new and existing green jobs in key sectors.

According to some estimates, nearly two million jobs in the US alone contribute to building climate resilience in the US and abroad – from agriculture to disaster preparedness or water management. If business and the public sector alike commit to adaptation, rapid growth across all relevant sectors is likely. And indeed, there are a good number of companies that have created value for their businesses and for the vulnerable communities whose resilience they are working to improve. From mobile water treatment plants to drip irrigation to text-message flood warning systems or weather-indexed insurance for crops, examples of affordable, adaptation-related technologies and services abound.

“Building preparedness for climate change through investments in adaptation can trigger new and expanded economic activity.”

Both risk management and business development should incorporate the adaptation needs of local communities. Strategic climate change adaptation investments can increase a company's and a community's capacity to respond to climate change obstacles and opportunities. Companies can partner with local communities to conserve natural resources on which they both depend. They can also work with local governments, civil society and citizens to design climate-resilient development and infrastructure plans and to prepare for emergencies. Proactive, positive relationships with the full range of local private and public sector actors – including entrepreneurs, civil society groups, citizens and local government officials – form a strong foundation for effective corporate engagement on climate change adaptation.

Conversely, where business and communities are not aligned in their efforts to build resilience, they often face severe risks that can range from reputational damage and loss of their social licence to operate to costly disruptions of operations and supply chains.

ADAPTATION IN THE CORPORATE CONTEXT

As best practice in the adaptation arena is still emerging, a 2011 survey among the nearly 400 corporate signatories to Caring for Climate, the UN Global Compact's climate action platform, offers several useful insights.

First, there is a strong need to understand 'adaptation' in the corporate context. Even among those that have joined Caring for Climate, the precise meaning and the operational implications of climate adaptation are often not clear. While certain climate risks – particularly related to energy and water – are widely acknowledged, others have yet to be interpreted in business terms. Among corporate practices identified by the survey, three types of action stood out:

Communicating adaptation imperatives as core business priorities. For instance, for one global beverage company climate adaptation meant making the security of its water supply, a key input in its products, a strategic priority. Here, adaptation was directly linked to the serious business implications of water scarcity and enabled an integrated strategic response.

Recognising diverse climate impacts on their operations, labour force, customers, suppliers and host communities. A mining company reported that climate change impacts on local communities around its operations were direct business impacts, particularly with respect to the health and availability of their local labour force. Similar cause-and-effect scenarios have prompted others to start quantifying climate risks and assessing them in terms of financial loss and reputational damage.

> **“Few companies are prepared to evaluate and develop solutions for customers facing changing climate conditions.”**

Integrating adaptation needs into core business planning processes. Some companies use existing risk management frameworks as a first step to institutionalise adaptation priorities for their operations, while others are focused on product development or supply chain management. For example, an electric power sector company conducts climate impact modelling and assessments of how those impacts affect their entire business value chain.

As questions about the precise implications of adaptation remain, most Caring for Climate participants surveyed described accessing new markets for adaptation-related products and services as an opportunity of 'high' or 'very high' importance – even though few have explored how consumer demands and preferences change and what the business implications may be. More broadly, our survey revealed two action patterns:

Identifying new risks or new market opportunities. The insurance industry, as mentioned earlier, is taking proactive measures to prepare for climate risks. Some companies identify climate risks among their raw-material suppliers and have taken steps to increase supply chain resilience. Others are developing and marketing more water-, energy- and resource-efficient products. However, few companies are prepared to evaluate and develop solutions for customers facing changing climate conditions.

> **“For the most part, climate change impacts are long term impacts.”**

Developing business strategies with mutual benefits to the company and community resilience. In some cases, companies are anticipating and preparing for water scarcity or flooding and responding with strategies that also help communities adapt to these conditions. In other cases, companies are protecting against rising food prices by helping suppliers and communities adapt agricultural production to new climate conditions.


Climate change impacts are long-term.

© Mila Zinkova

Finally, one primary challenge within companies is limited awareness of the need to adapt, which in turn limits interest and engagement. Furthermore, even within organisations awareness levels vary. While many executives may consider climate change an important strategic issue, action typically lags behind awareness. Consequently, **engaging multiple audiences with climate change communication strategies** is not only critical to increase awareness, but also to move from awareness to adaptation action. It remains an area with significant room for improvement.

For the most part, climate change impacts are long-term impacts. In a business climate that still regards short-term returns as more important than long-term sustainability, effective climate adaptation requires bold and holistic approaches that manage to link today's strategies with tomorrow's challenges and opportunities. Done right, building resilience and adapting to climate change will create true shared value for business and communities alike.

Some of the arguments expressed in this article are based on 'Adapting for a Green Economy: Companies, Communities and Climate Change', a joint publication by the UN Global Compact, Oxfam, the UN Environment Programme and the World Resources Institute.

Georg Kell is the Executive Director of the United Nations Global Compact. Spanning more than two decades, his career with the United Nations began in 1987 at the UN Conference on Trade and Development (UNCTAD) in Geneva. In 1997, Mr Kell joined the Office of the UN Secretary-General in New York, where he spearheaded the development of new strategies to enhance private sector engagement with the work of the United Nations. As one of the Global Compact's key architects, he has led the initiative since its launch in 2000. Prior to joining the UN System, Mr Kell worked as a researcher at the Fraunhofer Institute in Germany and as a financial analyst evaluating multinational companies' investment portfolios in Asia and Africa.

The **United Nations Global Compact** is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption. It is the world's largest voluntary corporate responsibility initiative, with more than 6,000 participants in over 130 countries.

Web: www.unglobalcompact.org

CLIMATE CHANGE ADAPTATION

A crucial component of our Sustainable Development Policy

The development of the EDF Group adaptation strategy started from the premise that the Earth's climate is changing. The full range of impacts may not yet be fully understood, but the climatic evolution has started and mitigation measures will be, in the short term at least, insufficient to stop it.

EDF Group devised an adaptation strategy that focuses on the principal challenges that lie ahead up to 2100.

We assumed a range of plausible long-term climate and economic scenarios to create a description of the likely effects on natural systems and processes.

MITIGATION VERSUS ADAPTATION

The most important means of minimizing the impacts of climate change, and thus the need for adaptation, is to limit and reduce greenhouse gas emissions at the global scale as early as possible.

EDF Group is the world's number one nuclear energy company and Europe's number one hydro-power company.

Our existing electricity generation fleet has the lowest carbon intensity of all major European energy companies.

We believe that low-carbon electricity generation has a vital role to play in cutting global carbon emissions, and we are leading this energy change.

However, climate scenarios show no significant downturn in the current global-warming trend for decades to come, even if drastic action were to be taken immediately at a global scale. So, whilst our business strategy focuses on climate change mitigation through widespread adoption of low-carbon generation, we must also prepare ourselves for the impacts of climate change that will occur.

Indeed, EDF has already started to make significant changes to its operations in response to changes to the climate that have already occurred.

CLIMATE IMPACTS

Climate change, observed and foreseen, influences EDF's activities in a variety of ways through impacts on existing installations, organisations, markets and stakeholders.

For example, many of our nuclear and thermal power stations use river water for cooling and discharge warm water back into rivers, a heavily regulated process. Hotter summers would increase river temperatures limiting our authorization to discharge warm water.

A warmer but more turbulent climate would also impact our distribution networks. Warmer summers would decrease efficiency, and stormier winters would cause more structural damage.

And we are already seeing our customers' demands change with more people using air-conditioning in summer. As a result, electricity demand in some markets peaks in the summer rather than in winter, reversing the historical trend. This has consequences for maintenance planning and for network reinforcement.

Adaptation to climate change refers to the capacity of EDF's main activities to adjust to these changes, either through minimizing the adverse impacts or by taking advantage of the benefits.

A proper adaptation strategy needs to take into account all of these aspects and to prioritize them.

EDF'S CLIMATE CHANGE ADAPTATION STRATEGY

Launched in 2010, EDF's adaptation strategy comprises 10 key points, implemented through action plans within each Group business line or company.

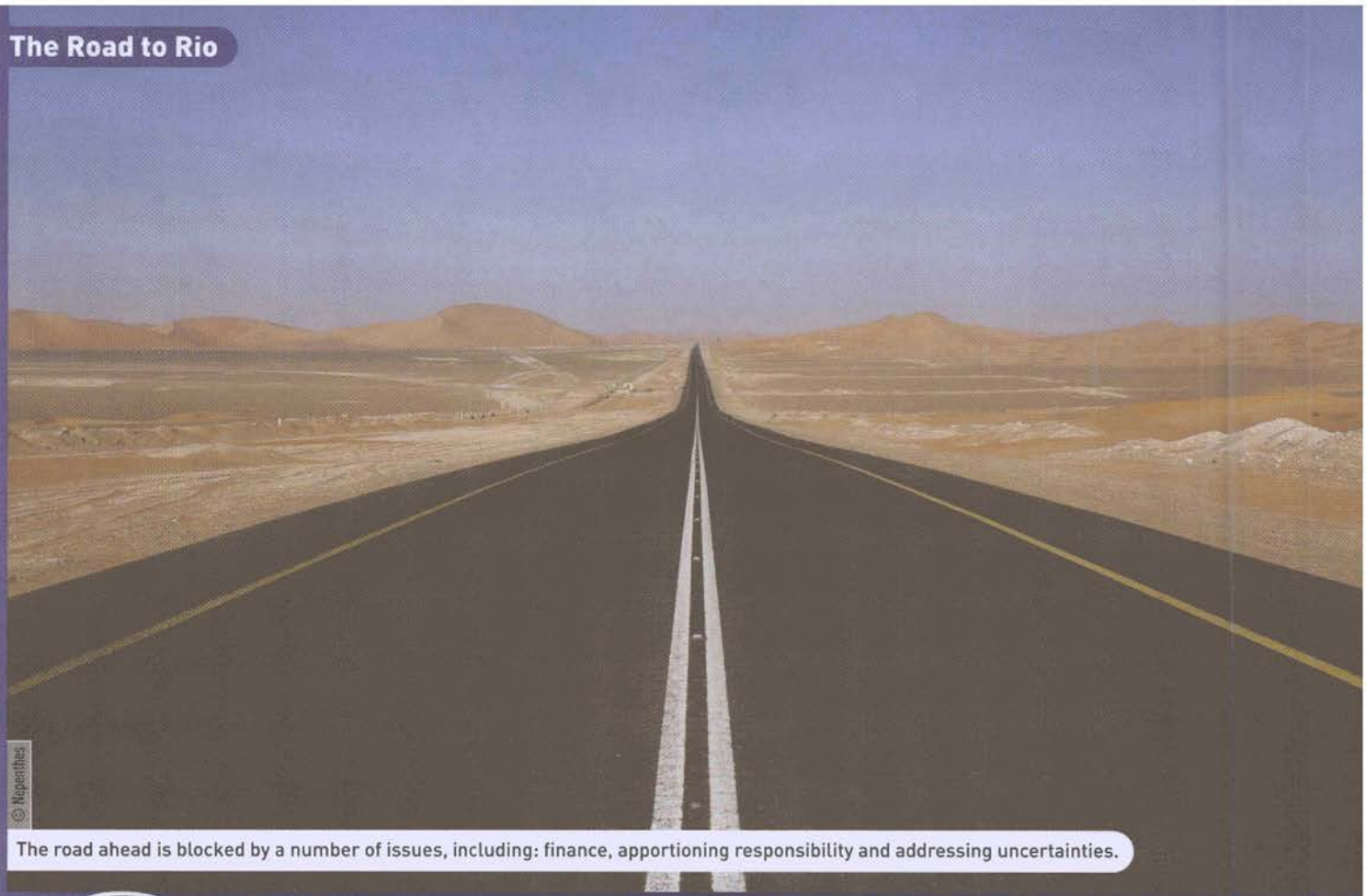
- **Gaining access to relevant and sufficient information**
  - Produce and exchange the right climate-related data and launch a joint project of databases for our businesses.
- **Adapting existing facilities certain to stay in the landscape for a long time**
  - Adapt our facilities, operating processes, in addition to our Climate Hazards Plan.
- **Mainstreaming the expected consequences of climate change into our design of future assets and facilities**
  - From the onset of the design phase, the future climate is one of the design parameters for future power-generation facilities.
- **Boosting our resilience to extreme climate events through direct application of our Climate Hazard Plan – Preparing for crisis management**
  - Prevent an extreme climate event from having catastrophic impacts, and return to initial status as early as possible.
- **Adapting our offers to climate change**
  - Based on consumer needs, also affected by climate change.
  - Factor in new uses, in particular smart grids and electric vehicles.
- **Adapting our internal operations and expertise to climate change**
  - Adapt the working environment and skills.
- **Activating the right R&D to address the right topics**
  - Deliver information on the latest breakthroughs about the predictable effects of climate change.
  - Provide support to define their impacts on our facilities and organisations.
  - Contribute to the construction of our future asset base.
- **Mainstreaming national and international solidarity when implementing our adaptation measures**
  - Solidarity in energy issues, and consequently in health issues as well.
- **Incorporating knowledge breakthroughs into our strategy**
  - Initiate and monitor action plans to implement this adaptation strategy.
  - Update the strategy based on the latest climate change forecasts.
- **Reinforcing dialogue between our entities and our respective public authorities**
  - Participate actively to the national debates devoted to the development of national climate adaptation strategy.

Examples of adaptation

• The small changes to the climate that we have already experienced have forced EDF Energy to re-assess their view of "normal" temperatures. By **integrating the results of climate change prediction models** EDF Energy is now able to more accurately forecast gas and electricity demand over the medium term (3 to 5 year ahead).

• Meltwater from underneath the Mer de Glace, in the Alps near Chamonix, feeds the 40MW "Les Bois" hydropower plant. EDF has **redesigned the sub-glacial water intake,** as accelerated glacier retreat will soon leave the water intake stranded.

• Extended periods of hot weather can affect electricity production. Power plants extracting water from rivers, for cooling or for steam, must work within strict boundaries to ensure stable river water temperatures, so as to comply with regulations. In order to adjust generation output at its power stations beside large rivers in France, and to provide quality information to the authorities, EDF has developed **more efficient hydro-meteorological forecasting systems** which consider water temperatures and river flow rates. EDF is therefore better able to predict the impact of heat waves on its generation capacity and to effectively anticipate periods when river levels are too low, or water temperatures are too high.



© Nopenthes

The road ahead is blocked by a number of issues, including: finance, apportioning responsibility and addressing uncertainties.

Long hard roads to Durban and Rio

By **Elizabeth Thompson**

As I sit to write this article, which I do in my personal capacity, the lyrics of Jamaican reggae icon Jimmy Cliff's 'Hard Road to Travel' come to mind.

"It's a hard road to travel and a rough, rough way to go,
But I can't turn back, my heart is fixed.
My mind is made up. I'll never stop.
My faith will see me through."

United Nations Secretary-General Ban Ki-moon has identified sustainable development and climate change as the two top priorities of his second term. On the matter of attaining inclusive sustainable development, one must embrace Jimmy Cliff's sentiments of being firm in mind and forging ahead without turning back, not out of a sense of resolute stubbornness but because the planet and its people need hope and sustained effort in crafting solutions to the challenges which we are facing. The UN is also uniquely placed to assist countries with these objectives.

Indeed, the confluence of crises and circumstances which have given rise to the current global tensions, uncertainty and upheavals – economic, ecological and social – require three things of all of us as individuals, but particularly of governments and the international institutions which connect them. First, we must accept responsibility that the current difficulties have been driven by our lifestyles and consumption patterns and in that regard, we must change. Second, there must be an acknowledgement that current development models do not address the existing problem. And third, governments and businesses must formulate and implement new approaches which will preserve our natural resources while allowing investment in human and social capital, together with business prosperity and economic growth.

THE DURBAN, RIO JOURNEYS

The original Rio conference was iconic, created global excitement, popularised Agenda 21 as a definitive statement on environmental and development issues, promulgated an integrated approach to development, presented society, economy and ecology as being equally important threads in the tapestry of development, and introduced new language and concepts into the development lexicon. Rio was also the birth mother of three new conventions, on Biodiversity, Climate Change and Desertification. Kyoto was itself ground-breaking, not only because it placed climate change on the multilateral agenda, but because, although

controversial, it introduced the concept of carbon capture and storage, established the Clean Development Mechanism and carbon as a traded commodity, with a market worth US$143.7 billion in 2010, up from $118 billion in 2008, which was itself an 84 per cent increase over 2007 (World Bank, 2010).

“There must be an acknowledgement that current development models do not address the existing problem.”

Now, with the Conference of the Parties in Durban and the follow-up to Rio, Rio+20, slated for June 2012 in Rio, we appear to have come to a major crossroads in the journeys on which these seminal conferences set us. Both conferences have their supporters and sceptics. In relation to climate change, the sceptics point to the disappointment of COP15 at Copenhagen in 2009, and the 'dwindling hope' for a negotiated multilateral agreement which has characterised and shadowed Copenhagen and Cancun and consequently now precedes Durban. On reflection, we should realise that the sense of disappointment in the Copenhagen outcome was due partially to the fact that the conference did not live up to its billing – as the summit which would produce a multilateral agreement to 'save the planet' from the peril of climate change. The summit ended with the leaders of the world assembled but without the anticipated legal agreement. Now, with the negotiations having become highly divided over several definitive issues, including targets, and commitments, and with some, including politicians, still discounting the existence of climate change, some argue that a cloud has fallen over Durban. There is a growing body of thought however, that the new UNFCCC Executive Secretary has managed to rebuild enough trust between North and South and South and South for more constructive engagement between the Parties.

What then of Rio+20? This conference will follow Durban by six months but the two are not inextricably linked. There is still sunshine as we approach Rio, for a number of reasons. Nostalgia and excitement surround Rio+20 as part of the legacy of the original Rio. This is in stark contrast to the controversy and absence of consensus which surrounded Kyoto almost from the onset. Citizens of every country want a sense of hope, and their governments must offer it through a suite of policies that deliver economic growth and an improved quality of life. A positive Rio+20 outcome will inspire multiple stakeholders with this much needed hope. The agenda of Rio is multi-focused and countries are suggesting a number of subthemes under the aegis of the green economy – water, energy, sustainable cities, blue economy/oceans, food security, green business and investment.

Rio's broad agenda and themes will precipitate a plethora of issues around which convergence might come, as opposed to a single issue over which there is significant divide.

While Rio runs on a different track to Durban, it must be conceded that a good outcome at Durban will create a more positive environment for Rio, and increase the likelihood of a positive Rio outcome. Equally, success at Rio will also create a corollary benefit for the climate change agenda since catalysing a global green economy will mean exploring low carbon policies, programmes and business approaches to reduce greenhouse gas emissions.

SOME OF THE ROADBLOCKS

There are a number of roadblocks common to both processes, including the issue of finance. Developing countries contrast the promise of funds with the reality of delivery and point to shrinking official development assistance (ODA), limited foreign direct investment and a lack of innovative financing; and they raise questions surrounding the capitalisation of the Green Climate Fund, such as whether the new fund is plus or minus ODA and monies previously promised but not yet disbursed. Yet progress on the parameters, structure and capitalisation of this fund would be a major positive result of both the Durban and Rio processes. UNEP, in its 2011 report *Towards a Green Economy*, urged that "a green economy creates jobs and economic progress … and higher growth in … GDP per capita." UNEP's report indicates that the transition to the green economy will require countries to invest 2 per cent per annum of global GDP from now to 2050, in "ten key sectors including agriculture, buildings, energy, fisheries, forests, manufacturing, tourism, transport, water and waste management". The critical question is, "Are countries willing and able to make that investment?"

Technology is in greater abundance in the North than in the South, except for the emerging economies. Developing countries, especially small island developing states which have been described by the World Bank, Commonwealth Secretariat and Barbados Programme of Action as having

Despite it's high profile and expectations, the Copenhagen Conference largely did not deliver the actions necessary to halt climate change.

© iStock

Climate Change is already being felt in small island states as their groundwater supplies are infiltrated by rising salt water.

'peculiar vulnerabilities' and are still at the level of primary production, will be marginalised without access to technology or the opportunities to commercialise viable indigenous technologies. This will have grave implications for their future economic and social aspirations.

"At the intergovernmental level new national and international conventions/initiatives addressing energy, water, transport, and food security might emerge."

Understandably, developing countries do not wish to be placed in a disadvantageous position. On the other side, countries and companies have very real concerns about protecting intellectual property, retaining competitive advantage, the provision of incentives to the private sector to create the enabling environment for green technology development and investment as well as safeguarding national industry and interests. Both for fixing the climate change challenges and the creation of the global green economy, green technologies will be pivotal to success. In this regard, countries have to determine what clutch of policies, legislative and regulatory matrix and fiscal incentives could stimulate private sector investment in the development and use of green technologies.

THE ROAD FROM DURBAN AND RIO

Looking ahead, what could we take away from Rio next year? The answer is 'multiple successes'. These would take the shape of a number of tangible projects and programmes such as the Secretary-General's 'Sustainable Energy for All', which should bring power to millions currently deprived of it, as well as increase energy efficiency, address private sector interest in enhancing shareholder value and brand identity by creating profitability in a resource constrained world and encouraging an academic initiative on sustainability. At the intergovernmental level new national and international initiatives/conventions addressing energy, water, transport, and food security might emerge, with strong emphasis on the idea of Sustainable Development Goals currently being advanced by some countries. While the developed country lifestyle is that to which the majority aspire, we have to face the issue of consumption patterns, as Professor Munasinghe has attempted to do with his Millennium Consumption Goals. Rio might start the dialogue on sustainable consumption and production and the development of a tool or measure of a sustainable development index (SDI), which may initially be used in conjunction with GDP measurements until fully elaborated and universally accepted and applied. The International financial institutions will have a key role in this.

Stockholm '72 initiated the international environmental agenda. Rio '92 defined the international sustainable development agenda and established ecology, economy and society as three inextricably linked pillars. Rio+20 will embed sustainable development in government policy and practice, and sustainability practices as the ethic by which businesses operate and the world's citizens live.

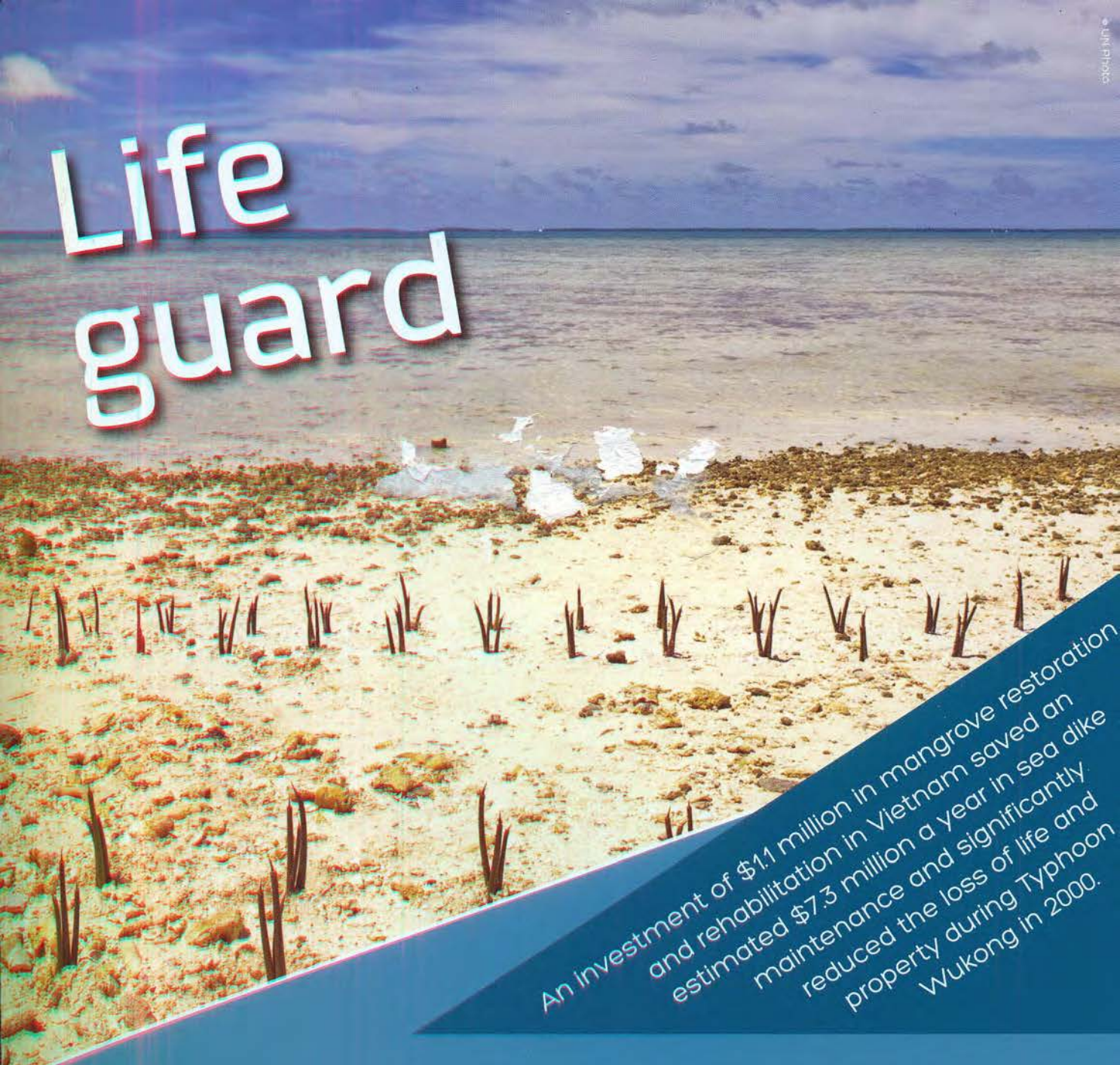
Accomplishing all this lies in the faith of which Jimmy Cliff sings. It is having faith in mankind to rise to the challenge of finding solutions to the problems that confront us. Paul Gilding captures this beautifully in *The Great Disruption*, when he says, "Given our natural survival instincts, our history as a species, our new global connectedness, and the scale of the threat … we will draw on what is great about being human and dig deep to express our highest potential – the potential that can take us through the coming crisis and out the other side to a stronger, safer and more advanced society."

The roads we take to and from Rio will put us safely along this trajectory.

Elizabeth Thompson is writing in her personal capacity, and not as an official representative. She is UN Assistant Secretary-General and Executive Coordinator of Rio+20. She is a former Member of Parliament and government Minster from Barbados, who at various times from 1994 to 2008 held portfolio responsibility for the Ministries of Environment, Energy, Health, Physical Development and Planning, as well as Housing and Lands. From 2008 to 2010 she was Leader of Opposition Business in the Senate and led a consultancy group which developed energy policy for two Caribbean countries. As a Minister, Liz Thompson led the development of national sustainable development, energy and green economy policies. She is a lawyer and qualified commercial arbitrator. Her Masters degrees are in business administration and energy law and policy. In 2008 she received the UNEP Champion of the Earth Award.

UNCSD Secretariat
2 UN Plaza, Room DC2-2220, New York, NY 10017, USA
Email: uncsd2012@un.org | Web: www.uncsd2012.org

Life guard



An investment of $1.1 million in mangrove restoration and rehabilitation in Vietnam saved an estimated $7.3 million a year in sea dike maintenance and significantly reduced the loss of life and property during Typhoon Wukong in 2000.

mangrove ecosystems not only combat climate change by storing carbon, they protect beaches from erosion, are coastal defences and act as nurseries for fish

UNEP

www.unep.org

GREEN ECONOMY: POWERING CLIMATE SOLUTIONS

YOU CAN'T BANK ON THE FUTURE WITHOUT THE FUTURE.

LEADING TOWARDS A SUSTAINABLE FUTURE.

At Nedbank we think differently about the future, based on our understanding of sustainability. That all things are connected. Past. Present. Future. This kind of thinking has seen us achieve several sustainability firsts and earn a reputation as the green and caring bank. Some of our accolades include being the first carbon-neutral bank in Africa (2010), the first SA bank to adopt the Equator Principles (2005) and the first SA bank to sign the CEO Water Mandate (2011).

So if you want to partner with a bank that cares and is committed to our future, call us today.
For more information visit us at www.nedbankgreen.co.za.

MAKE THINGS HAPPEN

NEDBANK

A Member of the OLD MUTUAL Group