UNEP

# Our Planet

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## ENERGY, FINANCE AND CLIMATE CHANGE

*Mark Edwards/Still Pictures*

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UNEP

*From the desk of*

## KLAUS TOEPFER

United Nations Under-Secretary-General and Executive Director, UNEP

There has been considerable debate over whether institutional investors in areas like pension funds have a legal duty to factor environmental, social and governance issues into their investment decisions. Some argue that these issues affect the performance of investments and thus the portfolios they manage. Yet many institutional investors continue to take the traditional view – that such issues are marginal, even irrelevant and that their legal responsibility is simply to maximise profits along more narrow lines.

**Investment decision**

A new legal appraisal, aimed at resolving this dilemma, would seem to steer the debate towards the first camp and has wide-ranging implications for the way the world operates, not least over energy and climate change. The study – compiled by Paul Watchman, a partner at the UK-based law firm Freshfields, Bruckhaus Deringer, on behalf of the UNEP Finance Initiative – concludes that institutional investors do have a legal responsibility to consider wider issues in their investment decision. "Indeed", it adds, "a failure to have regard to such considerations will often be a breach of the legal duties applicable to institutional investors."

It also concludes that, legally, investors must take into account the views of those who ultimately benefit from their activities and that those views are evolving to reflect society's interests in environment, social and governance matters. This has potentially profound implications on issues ranging from child labour to climate change.

Energy can also be a moral issue. The poor need it to pull them out of deprivation, but they also need it in more efficient and indigenous forms. Every time the oil price bounces over the $50 a barrel mark, poor countries are forced to spend extra money that could be devoted to education or healthcare.

**Golden opportunity**

Over the next three decades an estimated $16 trillion is likely to be invested in the energy sector to maintain, replace and expand infrastructure – about 60 per cent of it for electricity. This is a golden opportunity to deliver a less carbon intensive and more energy efficient world. The investment decisions of banks, pension funds, asset managers and others, whose portfolios represent trillions of dollars, will be critical in determining the energy mix.

**Solar cells**

Renewable energy, like photovoltaics and wind, have become increasingly competitive. Electricity generated from solar cells, for example, has tumbled from 100 cents per kilowatt/hour in 1980 to around 15 today. Meanwhile, the annual investment in renewables has risen sharply, from about $6 billion in 1995 to over $16 billion now. But it is clearly not enough and there are barriers, not least financial ones, preventing it realising its true potential. We also need greater investment and more imaginative economic instruments to deliver greater energy efficiency.

This issue of Our Planet comes out in time for the 11th session of the Conference of the Parties to the Climate Change Convention and its Kyoto Protocol in Montreal, Canada. The growing activity over cleaner energy is in no small part due to the Protocol's anticipated, and then final entry, into force – setting emission reduction targets and time tables up to 2012. I would like to pay tribute here to Joke Waller-Hunter, the Framework Convention's executive secretary who sadly passed away in October.

**Emerging economies**

Besides the Kyoto process, considerable activity is taking place in rapidly emerging economies, like China, and new initiatives are being spearheaded by the G8 and the United States emphasising technology transfer to developing countries. These activities cannot be a substitute for the Protocol, but they can complement it and may – if carefully scripted – help take us beyond 2012 towards the even deeper cuts needed to stabilise the atmosphere.

Let us hope that the investment community supports all these efforts. For as the Finance Initiative report makes clear, investment that takes account of environmental, social and governmental issues both makes economic sense and meets the wider and deeper goals so many of us espouse ■

**YOUR VIEWS**

*We would like to receive your feedback on the issues raised on this edition of* ***Our Planet****. Please either e-mail: uneppubl@unep.org or write to:*
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# Wake Up *Calls*

**PRINCE EL HASSAN BIN TALAL** calls for immediate action to tackle the world's escalating climate and environmental crises

Our environment is as temperamental and variable as we are – but its wrath speaks louder than the deafening silence with which we address its complaints about how we use and abuse it.

Extreme conditions cry out for extreme measures. The utter devastation inflicted by hurricane Katrina in the USA, and the recent storms and severe floods in Europe, serve as wake up calls for us all to rise to rescue both humankind and the environment.

Just think about the mutual relationship between earth and the sun. The sun emits light energy to heat the earth, which emits back infrared radiation by the natural greenhouse effect. This has made our planet some 30°C warmer than it would otherwise be, essential for life as we know it. The level of natural greenhouse gases that achieve this effect in the atmosphere is less than one per cent: generating more of them, together with increasing other industrial emissions, will disrupt our environment.

*Peter Schickert/Still Pictures*

**Many latent climatic changes are taking place, manifesting themselves in the aberrations and irregularities that we see in the rising oceans, the changes in cloud cover and the intensity of thunderstorms and hurricanes**

### Extremely hazardous

Germs and bacteria cannot be seen with the naked eye but this does not nullify their existence: they manifest themselves in the form of disease. The same holds true for the malevolent gases which are causing changes in the global climate that may be extremely hazardous for mankind. Burning coal, oil and natural gas generates carbon dioxide ($CO_2$); agriculture and changes in land use emit methane and nitrous oxide; vehicular exhaust fumes and industrial gases linger in the air; all work collectively to disturb the intricate balance of the interchange between our planet and the sun.

The somewhat brighter side of the story is that oil-fired power stations, smoke from deforestation, and the burning of organic material produce aerosols that reflect sunlight back into space, thereby cooling the earth and countering the greenhouse effect to a certain extent. The aerosols, however, are relatively short-lived compared to the greenhouse gases (GHGs), making their cooling effect insufficient in the long term. They can also cause acid rain and poor air quality.

Many latent climatic changes are taking place, manifesting themselves in the aberrations and irregularities that we see in the rising oceans, the changes in cloud cover and the intensity of thunderstorms and hurricanes.

In system dynamics, feedback can be positive (damping change) or negative (reinforcing it). Positive feedback loopholes have been identified within the climate change system. Triggered by GHG emissions, they accelerate the global warming effect and threaten to spiral out of control. Negative feedback, on the other hand, helps to slow down and control climate change.

### Optimal conditions

Climate change is characterised by increasing sea and air temperatures, which cause a decrease of $CO_2$ absorption. Surface waters are becoming more acid, reducing optimal conditions for planktonic life and thus plankton absorption of $CO_2$. The warming also generates high levels of atmospheric water vapour, itself a powerful GHG.

A warming of as much as two degrees could produce ocean level increases of two feet by the year 2050. One billion people – 17 per cent of the world's population – live on land likely to be dramatically changed by the rising waters, with low-lying countries hardest hit. The potential refugee problem will worsen the global situation.

Recent studies suggest that there is a critical point at which positive feedback loops become dominant and render further increases in temperature independent of any reduction ▶

in human generated greenhouse gases. Even if we drastically reduce GHG emissions today our planet will continue to heat for decades.

Already 40-50 per cent of the world's population are undernourished and there are 50 million starvation-related deaths each year: 14.6 million of the casualties are children. Meanwhile, 1.5 billion people do not have safe drinking water and twice as many lack basic sanitation.

Factor in the world's ever increasing population (now at 6.25 billion and expected to increase by over 12 per cent over the next 12 years), the rush to modernisation of the developing countries (which account for 98 per cent of the annual population growth) and the increasing energy they will use, and the concept of environmental catastrophe becomes inevitable.

### Enormous stress

Forty per cent of our remaining forests will disappear by the year 2050, and with them, the quality of the air we breathe. Deforestation, overgrazing and poor farming practices result in soil erosion. When only 60.5 per cent of the world's land mass is suitable for agriculture and topsoil cannot be replenished, this translates to worldwide famine in 40 years.

Enormous stress is being put on the Earth's recuperative powers to sustain the world's growing population. Twenty mega cities already have hazardous air quality. Heavy metal levels exceed safe parameters in most cities' drinking water. Over 70 per cent of the 73,000 chemicals now in use have never been tested for their effects on the environment and living organisms – and many, like components of pesticides, are both dangerous and found throughout our food chain .

The condition of the oceans is equally miserable, with oil spills and other contaminants threatening aquatic resources and the major supplies of food they provide. Current garbage disposal methods pose further problems as burning pollutes the atmosphere, landfills contaminate aquifers, and ocean dumping destroys the aquatic environment.

Serious and extensive effort better to understand, analyse and tackle our environmental challenges and their underlying causes has blossomed in many invaluable initiatives and reports – including, to mention but a few: the "Planetary Contract" of the Global Marshall Plan by Dr. Radermacher; the Meadows Report presented to the Club of Rome on the "Limits to Growth"; the Trans-Mediterranean Renewable Energy Corporation (TREC); and the proposal for "A Community of Energy, Water and Environment" for the Middle East, North Africa and the European Union, discussed in Prague in October.

### Fossil fuel

Scientists, policy-makers and industry must continue to toil together to address this formidable multitude of issues, and to try to find alternative forms of clean, sustainable, affordable and tradable energy. Saving fossil fuel is a lot cheaper than burning it for the environment and, in the long run, for us too. Research is ongoing, and endless proposals to produce hydrogen, wind, solar, photovoltaic and bio- energy are being drafted and tested as we continue with our carbon-rich lifestyle.

**Forty per cent of our remaining forests will disappear by the year 2050, and with them, the quality of the air we breathe. Deforestation, overgrazing and poor farming practices result in soil erosion**

As consumers, we can set the requirements, the demand and policy for maintaining life on our planet for the coming generations, by altering our routines of acquisition and consumption and by opting for less now in order to have more in the future. We must adopt a strongly negative carbon culture, and improve end-use efficiency as the fastest and most lucrative way to save energy. Science is a Godsend because it can not only predict disasters, but contain them.

In "The Meridian Report" of July 2005 David Wasdell, director of the Meridian Programme, wrote:
"We cannot afford any further delay in effective action. Any procrastination increasingly risks global bankruptcy in financing the needed intervention, and massive human suffering in carrying it through to completion. It also threatens our ability to regain control before the system is overwhelmed by the positive feedback loops and drifts inexorably into runaway global warming. To allow the collusional vested interests of the social, economic and political systems to continue to hijack the world and hold it to ransom for the sake of short term profit and national protectionism, would be an act of collective suicide. I do not wish to believe that humanity is that mad."

Let's act now before we become nomads following a mirage in search of an oasis in the middle of a desert ■

*HRH Prince El Hassan bin Talal of the Hashemite Kingdom of Jordan is founder and director of the Hashemite Aid and Relief Agency, Centre for Educational Development, and the Institute of Diplomacy, and President of the Club of Rome.*

*Roger Le Moyne/Topfoto*

# *Shared*
# Responsibility

**CHUCK HAGEL** outlines principles on which the United States and other countries can agree to combat climate change

*Antonino Macías Martínez/ UNEP/Still Pictures*

The question we face is not whether we should take action on climate change, but what kind of action we should take. Climate change is a shared responsibility for all nations, including the United States: it does not recognise national borders. Global climate policy affects the world's economic, energy, and environmental policies – and dealing with it requires a commitment of diplomatic leadership and coordination worthy of the magnitude of the challenge.

Earlier this year I introduced legislation with Senators Pryor, Alexander, Landrieu, Craig, Dole, Murkowski, Voinovich and Stevens, which I believe can help contribute to a new American and international approach to climate change. The legislation, which passed into law in July as part of the Energy Policy Act of 2005, emphasizes the linkages between global environmental, economic, and energy interests – and the priority of working closely with developing countries on them. The challenges of a clean environment cannot be separated from the imperatives of growing economies, or from the challenges of global poverty and underdevelopment. Our approach built upon three principles, which I outlined at a speech at the United Nations earlier this year.

## Energy technology

First, a workable global climate policy should include shared responsibilities and common standards by developed and developing nations in reducing greenhouse gas emissions. Developing countries are becoming the major emitters of these gases, but they are exempted from the Kyoto Protocol. Within the next 20 years, they are projected to account for two thirds of the growth in carbon dioxide emissions, as their populations and economies expand. Any reduction in greenhouse gas emissions by the United States and other developed countries will be eclipsed by those from developing nations, such as China, which will soon be the world's largest emitter of man-made greenhouse gases.

I understand that developing nations cannot achieve greenhouse gas reductions until they obtain higher standards of living for their people. They lack clean energy technology and they cannot absorb the economic impact of the changes necessary for emissions reductions. Any future policy initiatives must recognize their limitations in meeting these objectives, and the necessity of including them in any successful future initiative.

## Environmental initiative

It is in the interests of the United States and industrialized nations to help developing countries by sharing cleaner energy and environmental technology. They can then "leap-frog" over the highly polluting stages of development that countries like the U.S. have already been through.

Second, and related, global climate policy – like any environmental initiative – cannot be considered in isolation of economic and energy interests. Too often, environmental policy has been considered in a kind of vacuum, without sober analysis or appreciation of the economic implications of environmental objectives. Climate policies must combine action on the environment with the need for increased energy resources to fuel economic growth and development and to reduce poverty in developing countries. That was the message from developing countries at the 2002 World Summit on Sustainable Development in Johannesburg. It will require a market-driven, technology-based approach that complements the world's environmental interests, and connects the public and private sectors.

Global climate change must be considered in the wider context of the challenge of economic underdevelopment and worldwide poverty. Five billion of the world's six billion people live in less developed countries. Half live on less than $2 per day. One billion lack access to clean water sources, and more than 2.5 billion do not have proper sanitation. Forty million people are infected with HIV or living with AIDS – the leading cause of death in sub-Saharan Africa. There will be 8 billion people by the year 2025 and most of the world's population ▶

growth will be in developing countries, where nearly one-in-three is under the age of 15.

Many developing world governments will not be able to meet the basic demands of their populations for jobs, health care and security. The strains of demography, frustrated economic development and authoritarian governments contribute to radicalised populations and politics. Part of the solution depends upon sound economic growth strategies. Global climate policies cannot be considered in isolation of the challenges of poverty and underdevelopment.

### Climate policy

We are most successful in confronting the most difficult issues when we draw on the strength of the private sector. There is a role for diplomacy in global climate policy, but technological innovation will come from the private sector, and from public-private partnerships, which meld the institutional leverage of governments with the innovation of industry. Creating incentives for private sector participation and technological innovation will be critical to real progress on global climate policy.

Such policy must give priority to the development of alternative clean energy sources and renewable fuels. Advances in energy efficiency are directly connected to economic and environmental policies. The acceleration of alternative clean energy sources and renewable fuels will depend on technological innovations by private industry – another reason for incentives for public-private partnerships in our climate policy.

### Economic output

I believe that greenhouse gas intensity – the amount of carbon emitted relative to economic output - is the best measurement for dealing with climate change now. It measures how efficiently a nation uses carbon emitting fuels and technology in producing goods and services, and captures the links between energy efficiency, economic development and the environment. For developing countries, improvements in greenhouse gas intensity can help improve an economy's efficiency and competitiveness. It can, and should, be the baseline measure for greenhouse gas emission reductions for both developed and developing countries.

There is great promise for these clean fuel additives and renewable fuels in the United States, and around the world. We should work together to accelerate the development of corn and soy products, such as ethanol and bio-diesel, as renewable fuel sources – and of wind, hydrogen and nuclear power. Last year I toured the research and technical centres of three major automobile manufacturers in Detroit, and was particularly interested in the progress of advanced technology vehicles using fuel cells and clean diesel technology, and hybrids. These technologies have the potential to transform our transportation sector while supporting a proactive global climate policy.

*Mark Edwards/ UNEP/Still Pictures*

### Growing interest

Geologic storage – involving pumping carbon dioxide into the ground, rather than dumping it into the atmosphere – offers another example of the role that private industry and technological innovation can play in climate policy. BP has been using it in Algeria's Sahara Desert, Statoil has been working on it in Norway's North Sea, and Chevron Texaco is planning a project off the coast of Australia. An article in the Wall Street Journal early this year reported that, "the concept is drawing growing interest because it could curb global warming more quickly than switching to alternative energy sources or cutting energy use." There is still much work to be done, but this is the kind of technology that must be employed around the world to achieve meaningful results in reducing greenhouse gas emissions.

### Global consensus

The science upon which we base our climate policy must reflect realistic measurements and achievable research objectives. The scientific community is not uniform in its assessments of the causes of climate change. There will always be uncertainties and incomplete information.

A fresh injection of political will is needed to achieve a global consensus on climate change. The United States must be part of that consensus. Achieving reductions in man-made greenhouse gas emissions is one of the important challenges of our time. As a signatory to the UN Climate Change Convention, America must remain engaged in international initiatives to reduce manmade greenhouse gas emissions. America has an opportunity and a responsibility for global climate policy leadership, and – by harnessing our many strengths – we can help shape a worthy future for all people, and build a better world ■

*Chuck Hagel, the senior US Senator from Nebraska, is Chairman of the Senate Foreign Relations International Economic Policy, Export and Trade Promotion Subcommittee and of the Senate Banking Securities and Investment Subcommittee.*

# *Imagination* Breakthrough

**JEFFREY R. IMMELT** calls for a new green technology revolution and describes why it makes sense for business to lead it

It is disappointing that our nation, the United States—which has always seized new opportunities, created new markets and developed new technologies—is failing to push the envelope on cleaner power and environmental technology. Disappointing, too, is our failure to develop a coherent energy policy, which has meant that, nationally, we have not realized our full potential.

It is time for the private sector to assume its rightful place as a major catalyst for environmental change. For far too long people in it have viewed protecting the environment as a no-win business. We believe that the growing market for environmental technology can get us where we need to be.

But industry cannot get there alone. We need to work in concert with the government and environmental groups to promote and reward leadership. We believe that the government can provide leadership by clarifying policy, committing to "market mechanisms," and promoting diverse energy sources.

### Lasting value

This starts with clarity and certainty in energy and environmental policy. Even with the technology at hand, breakthroughs of truly lasting value will only come if government, industry and advocates create certainty on the way forward and commit the intellectual and financial capital needed to find solutions.

There is no time to wait – because tomorrow is now. We are living in a carbon-constrained world where the amount of carbon dioxide we emit must be reduced. We can address that reality head-on, driven by innovation, or by getting pulled into it through regulation.

Industry's responsibility is to lead, and we must set aggressive and meaningful targets, which raises the stakes and brings forth our best. We must have a proactive business policy or we will get a reactive government policy.

We believe in the power of market mechanisms to address the needs of the environment. However, we think that goals, supported by market incentives, drive result

We must drive fuel diversity. Just as no one single fuel source or technology can achieve reliable supply and stable pricing, no single fuel can provide the "silver bullet" on greenhouse gas emissions or ensure energy security. U.S. policy should recognise the necessity for proven technologies in the near-term, and establish incentives for development of new ones in the long run.

Nuclear energy is a proven asset. GE has been in this business for 40 years—and we don't stick with the theoretical for decades at a time. We have seen successful technology evolve and we believe firmly in its future. Nuclear is emissions-free. It strengthens our resource diversity and – by strengthening our energy security – bolsters our national security.

By combining the innovative spirit of its entrepreneurs with a focused and forward-looking policy approach, America can lead in the energy sector. We are optimistic about America's ability to emerge ahead of the pack. But we must act now.

### Scarce resources

GE is making a new commitment to our customers around the world to define the cutting edge in cleaner power and environmental technology. We have taken a long look around and this is what we see: diminishing domestic oil and natural gas reserves…our continued dependence on foreign sources of energy…increasingly scarce resources like water in an ever more populated world…and the signs of global climate change. This convergence of forces demands nothing less than a revolution in technology.

We plan to lead this revolution and help open the door to a new age. That requires a new "imagination breakthrough." We call it ecomagination.

Ecomagination is a new, concrete commitment by GE to develop and drive the technologies of the future that will protect and clean our environment—innovation to promote energy efficiency, lower emissions, reduce our use of fossil fuels and increase the supply of useable water. Ecomagination is a growth strategy, driven by our belief that applying technology to solving problems is good business. And ecomagination is a commitment to invest billions over the next decade in creating cleaner power and water technology and to improve our own environmental performance as a company.

These are daring goals, but we believe we can help improve the▶

*Mark Edwards /Still Pictures*

**Industry's responsibility is to lead, and we must set aggressive and meaningful targets, which raises the stakes and brings forth our best. We must have a proactive business policy or we will get a reactive government policy**

environment and make money doing it. We see that green is profitable.

With *ecomagination*, we make five commitments.

First, we commit to double our technical investment in energy efficient and environmentally friendly products to $1.5 billion by 2010. This will lead to a constant stream of new products flowing into this growing field. Our broad portfolio of *ecomagination* products includes wind turbines that harness enough wind to generate power for millions of people, a locomotive that saves nearly 200,000 gallons of fuel throughout its lifetime, and an aircraft engine that is 15 per cent more energy efficient.

### Low emissions

Our second commitment is to make our customers true partners in the *ecomagination* programme. We will target technologies that significantly improve operating and environmental performance, while demonstrating their value in hard economic terms, and providing financing that supports the development and application of new technologies.

Clean coal technology is a great example. This idea has been around for decades, but has been too expensive. Our approach is to work with our customers and bring a system to market that creates value, uses coal with low emissions, and is economically competitive.

Third, we commit to improve our own environmental performance. We are going to invest every year between now and 2012 in order to improve the energy efficiency of our operations by 30 per cent and reduce our worldwide greenhouse gas emissions by one per cent. We believe that 70 per cent of this investment will be in our own technology.

A one per cent reduction may not sound like much. But GE is a growth company, and if it were to continue to grow as we project, our emissions would go up more than 40 per cent by 2012.

Fourth, we commit to increase our sales and profits based on this initiative. We are investing in environmentally cleaner technology because we believe it will increase our revenue, our value and our profits. We are launching *ecomagination* not because it is trendy or moral, but because it's good for business.

Today our revenue from *ecomagination* products is $10 billion. This will rise to $20 billion by 2010, generating organic growth of 15 per cent. Our revenue growth will take place across the company – in energy, transportation, water, consumer products and materials.

### Clear goals

Fifth, and finally, we pledge to inform the public of our progress. As part of our overall corporate effort to improve transparency, we pledge to issue an annual citizenship report on how we are meeting our own environmental goals.

Imagine a future where cleaner, quieter aircraft engines carry us farther and faster. Where tiny fuel cells power an entire neighbourhood or industrial park. Where mercury free lamps illuminate our highways and streets. And where new technology brings clean drinking water to millions who have never known it.

Some will call these ideas impossible and our commitments ambitious. But at GE we believe that ambition is the key to innovation. As our founder, Thomas Edison, said, "I find out what the world needs, then I proceed to invent it." Today the world needs the thousands of scientists, engineers and dreamers who are his heirs.

No one knows what the future will hold. But we know today that there is a vast new profitable market in cleaner technology. We know that protecting our environment and building our economy go hand in hand. We know that green is profitable.

We also know that there is a global need for increased innovation. Europe has been a leader in renewable energy. They have set clear goals, including a plan to double the share of renewable energies in gross domestic energy consumption from the present 6 per cent to 12 per cent by 2010. China offers immense business opportunities. It has 16 of the 20 most polluted cities in the world, and its government has set aside $85 billion for environmental spending. This will require substantial commitments in new power generating technology and desalination. GE investors will be rewarded by our leadership in ecomagination.

*Ecomagination* is about what we can do right now – and what we will be able to do in the future. We are working to imagine the world of tomorrow. We are confident that we will succeed. GE's corporate focus is "Imagination at Work." We believe our ability to imagine is as limitless as our potential to achieve ■

*Jeffrey R. Immelt is Chairman and Chief Executive Officer of General Electric.*

*Hoai Phuong/ UNEP/Still Pictures*

# Orchestrating *Change*

**LEONARD GOOD** says that transferring new technologies to developing countries is essential in combating climate change, and describes how it is being done

Last year's entry into force of the Kyoto Protocol, and its introduction of the European regional emissions trading system, brought to the forefront longstanding commitments to implement the United Nations Framework Convention on Climate Change (UNFCCC). But discussions have also gone beyond the Convention context: climate change was one of the main topics at the Gleneagles G8 summit, as well as in some other regional fora. The global effort to promote renewable energy in the wake of the 2004 Bonn conference has led to the establishment of a Renewables Policy Network and a follow-up forum in China in November. September's United Nations Summit highlighted the importance of energy for sustainable development and for achieving the Millennium Development Goals. Preparations are starting to gain momentum for next spring's 13th Session of the Commission on Sustainable Development, focusing on energy, and many similar initiatives will continue over the next year.

All these processes share a recurrent theme: that attaining the UNFCCC 's ultimate goal is only possible if new technologies form an integral part of sustainable development in developing countries. Respecting this, the Global Environment Facility (GEF) has always taken a two-pronged approach as the Convention's financial mechanism. Its support to Non-Annex I Parties starts with enabling the process of strategy formation and capacity building at the policy level, through funding National Communications – including Technology Needs Assessments, National Capacity Self Assessments, and National Adaptation Programmes of Action. These official documents form the basis of countries' climate change strategies for both adaptation and mitigation. Using the resources of the GEF investment programmes, countries can receive incremental funding to help implement their technology priorities, build further operational capacity, and remove the barriers to disseminating technology. The Clean Development Mechanism (CDM) is now also operational - and, with some decisions on Joint Implementation in Montreal, at the joint Conference of the Parties of the Convention and Meeting of the Parties of the Kyoto Protocol, all the Convention's financial mechanisms will be in place, triggering real change in our joint efforts to implement it.

This multitude of instruments and mechanisms can play together in an impressive orchestra. The GEF's long-term, programmatic support builds capacity, helps countries put in place enabling environments for technological change and development, and assists them in improving their overall access to clean technologies. Flexible mechanisms provide short-term, project-oriented revenue enhancement that can encourage investors, nongovernmental organizations, and communities to use those clean technologies as much as possible. When the two go hand-in-hand they can have wide-reaching impact, successfully transferring technology – which is what we strive for at the GEF.

An example is GEF's support for mini-hydro power plants in two northern Indian States. While the ultimate objective of this project was to facilitate investments into grid-connected small hydropower plants, the project spent much time and effort to get the right information about technologies, to map the hydrological resources in the area, and to change the policy frameworks for investment and for the power sector in such a way that independent power producers would be able to sell the power generated to the grid. Now, two years after the project has ended, several replicator projects are in the pipeline for the CDM.

**Technical capacity**

Developing countries need modern, energy efficient, or zero-emission technologies to make economic development sustainable. This technology transfer requires a constant and long-term thrust nourished by a reliable partner, such as the GEF, that leads towards growing technical capacity to go along with the investment ▶

capital required. The relevant bodies under the Subsidiary Body for Scientific and Technological Advice – the Intergovernmental Panel on Climate Change, and the Expert Group on Technology Transfer – have identified how important the foundational capacity is for effective technology transfer. They call for enabling environments and the build-up of local technical capacity. GEF projects have been helping countries provide enabling environments and build up capacity and will continue to do so.

GEF support has often been instrumental in constituting North-South and South-South partnerships that are elementary for technology transfer and local development of technologies. This is particularly important in those GEF programmes that focus on very new and progressive technologies. For example, four GEF projects with the World Bank will invest in different solar power plants, such as those which have been operational in California for over a decade. In June, a partnership between Southern utilities and Northern technology suppliers of solar technologies that will continue to build on these experiences has been launched by UNEP and GEF. Another example is GEF's Fuel Cells Financing Initiative, in which the International Finance Corporation works together with private sector technology companies that use fuel cells in a large number of applications. While initially investing generous amounts of money to demonstrate the applications, GEF and the World Bank's International Finance Corporation are paying heed to making the replication of these applications as easy as possible and removing barriers to technology dissemination along the way.

**Private partnerships**

Another technology programme is focusing on the efficiency of industrial boilers. GEF-supported efforts to reduce coal use and greenhouse gas emissions in these boilers in China have demonstrated win-win opportunities. Roughly speaking, coal is responsible for 80 per cent of China's greenhouse gas emissions. About 40 per cent of Chinese coal consumption is burned in industrial boilers and municipal systems, and 95 per cent of these systems use coal. GEF support has made it possible for eight Chinese boiler manufacturers to enter into technology transfer agreements with international partners. Because of these arrangements, the manufacturers, can now bring more energy efficient boilers to market.

These are a few examples of how GEF projects promote pilot business and delivery models, public private partnerships, joint ventures, and other advanced risk sharing arrangements that help involve the private sector and bring modern technologies to our recipient countries. In many cases, the risks perceived by the private sector discourage investments, but the presence of a multilateral partner provides confidence and hands-on help in securing financing and legal agreements that are necessary for private sector engagement. Once an initial investment model is successful, it can then serve as a role model for other investments.

Sustainable energy technologies do not have to be expensive. There is significant scope for establishing energy efficient technologies in normal consumption patterns with no additional costs. We are constantly looking for these win-win situations. In many instances, consumers can save money by reducing their energy consumption and greenhouse gas emissions. Where this is possible, GEF market transformation programmes typically provide resources for technology information and awareness campaigns, and help implement technical standards and labels, which help consumers identify the energy-efficient products. Technical standards require sufficient local technical know-how and facilities to enforce the standards domestically, and therefore, the GEF programmes in these areas also build up technical capacity and expertise. The GEF is committed to the Convention process and to the UNFCCC objective. Technology is a crucial part of this, particularly for developing countries. Technology transfer can only have large-scale impact if foundational capacity building is combined with a large-scale investment push and a broad dissemination of the technology. The GEF is well placed to facilitate both processes and help developing countries achieve access to modern technologies. I look forward to a continued cooperation with all countries – both donors and recipients – on these critical issues ■

*Leonard Good is CEO and Chairman of the Global Environment Facility.*

*Hartmut Schwarzbach/Still Pictures*

*Bagan Maung/ UNEP/Still Pictures*

# Poor *Prospects*

**R. K. PACHAURI** examines the poverty and energy security dimensions of global climate change, and calls for a combined initiative on renewable energy

The average surface warming of the Earth during the 20th century is estimated to have been around 0.6ºC. The Intergovernmental Panel on Climate Change's (IPCC) Third Assessment Report (TAR) concluded that "there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities." It provides projections of an average surface temperature increase between 1.4ºC to 5.8ºC in the current century, and an average sea level rise of between 9 cm and 88 cm.

Significantly, the report adds: "the impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, and thereby exacerbate inequities in health status and access to adequate food, clean water and other resources." Several of these impacts would have serious consequences for efforts to eliminate poverty, particularly in respect of our ability to achieve the Millennium Development Goals established in the year 2000 by the United Nations.

## Expanding population

Perhaps the most serious concern relates to our ability to ensure adequate food and nutrition for an expanding population. The projections of climate change indicate that, though potential yields may rise with small increases in temperature in some temperate areas, they would decrease with larger ones. And potential yields are expected to fall in most tropical and subtropical regions for most projected temperature increases.

Simultaneously, the availability of water is expected to decrease in most of these areas even as the demand for it is likely to increase as a result of population growth and economic development (though, of course, demand may decrease through increased efficiency of use in some countries, particularly in the developed world). Initially, water flows may actually grow in regions which depend on water flows from glaciers, such as the northern parts of the Indian subcontinent, but they are also expected to decline over time as the glaciers which feed water supply retreat.

## Negative effect

Reduced water supply would also hit agricultural production. Since the largest source of jobs in several parts of the world is related to agriculture, the TAR assessed that climate change would have serious consequences for the employment of an expanding population. A high per centage of GDP in the agrarian economies of Asia and ▶

Africa also comes from agriculture. Such indirect effects as changes in soil moisture and the distribution and frequency of pest infestation and diseases can have a negative effect on agricultural output, over and above possible declines in yields, on account of temperature increases and growing water scarcity. These changes could reduce income for the most vulnerable sections of society and increase the absolute number of people at risk of hunger. Thus the outlook for agriculture provides cause for concern, not just in terms of food and nutritional security but in reduced incomes and livelihoods for agrarian communities.

One likely effect of climate change is that the duration, location, frequency and intensity of extreme weather and climate events are likely to change, resulting mostly in adverse impacts on biophysical systems. These could cause changes in the variance and frequency of extreme climatic variables. More hot days and heat waves, and fewer cold and frost days, are very likely over nearly all land areas. These changes in temperature extremes are likely to result in greater crop and livestock losses, higher energy use for cooling (though lower for heating), and increased human morbidity and heat-stress-related mortality. These effects are also likely to have a disproportionately high impact on poor people.

### Global responses

The health effects of climate change also have implications for poverty and the state of the poor. Climate change can affect human health through multiple pathways. Direct effects include the changes in extreme events and loss of life from floods and storms. Indirect effects would occur through increased heat stress, reduced water and air quality, and changes in ranges of disease vectors such as mosquitoes and water-borne pathogens.

Most of the impacts of climate change require greater emphasis on adaptation measures. Some require global responses, but all would involve a restructuring of local institutions and actions to permit suitable anticipatory adaptation measures to be taken. There is need, for instance, for major research and development at the global level on developing drought-resistant and salt-tolerant crop species. These would, of course, require specific attention to local conditions in different parts of the world. As water is likely to get scarcer, it will be essential to bring about institutional changes in managing its supply and use, particularly in agriculture. These would be most important in areas dependent on rain-fed agriculture, where changes in precipitation patterns could adversely affect activity.

### Premature mortality

Over two billion people lack access to electricity and modern forms of energy. Their economic condition is characterized by low-income levels and consequently of a low range of choices. In Amartya Sen's words: "poverty is deprivation of basic capabilities, rather than merely low income, which can be reflected in premature mortality, significant undernourishment (especially of children), persistent morbidity, widespread illiteracy, and other failures."

**Over two billion people lack access to electricity and modern forms of energy**

Choices, particularly for the poor in rural areas, can be enhanced only through the appropriate provision of energy, preferably through decentralized and distributed technology. Using renewable energy technologies limits emissions of carbon dioxide and other greenhouse gases compared to conventional energy supply. Such solutions would also enhance the incomes of poor people, providing them with a capacity to adapt to the impacts of climate change, which could otherwise be constrained by persistent poverty. A combined institutional initiative for mitigation and adaptation measures would be essential in this area.

### Development strategies

In view of the likely impacts of climate change, and their implications for economic development at the basic grassroots level – particularly for poor communities – it is essential that they are carefully integrated in future development strategies in different parts of the globe. This would, of course, call for substantial region-based assessment of the nature and extent of climate change and its impacts.

For this reason the IPCC's Fourth Assessment Report (AR4), has included the assessment of the regional aspects of climate change – among cross cutting themes identified for emphasis – in greater depth than in its predecessors. The extent to which regional assessments become possible, however, would directly depend on the extent of research that is carried out in different parts of the world. Multilateral organisations and national governments both have a responsibility to support such research if the predicament of the poor is to be understood. It is needed as the basis on which effective mitigation measures can be undertaken globally, and adaptive measures locally. Even more critical – over and above assessing the biophysical impacts of climate change – is the need to support and foster research on their socio-economic dimensions ■

*Dr. R. K. Pachauri is Director-General, The Energy & Resources Institute (TERI) and Chairman, Intergovernmental Panel on Climate Change (IPCC).*

*Nguen Huy Binh/ UNEP/Still Pictures*

Mark Edwards/Still Pictures

# A New *Conversation*

**KURT HOFFMAN** says that business and the development community must join to end the dearth of aid and investment to meet the energy needs of the poor

One statistic remained stubbornly unsung among all the ones quoted at length by anti-poverty campaigners and pop stars in 2005 – that two billion people in developing countries lack access to modern energy services.

As access to modern energy is such a core determinant both of productivity and closing this gap – in environmentally sustainable ways – this poses one of the biggest and most urgent of all development challenges. So it is lamentable that energy access is not recognised as a Millennium Development Goal in its own right. Lack of it is both a cause and a consequence of mass poverty.

**Some people in some development agencies and NGOs are certainly trying to learn the language of business – and this is good. But they have a long way to go**

Over the last 15 years there has been no shortage of international meetings and conferences – ranging from the World Solar Summit and the G8 Renewable Energy Task Force, to the UN Conference on Environment and Development – that have contributed to drawing attention to the issue. But, while it has percolated within the international development community for over a decade, very little of this awareness has been translated into delivery on the ground.

Indeed, one only has to follow the money to find out what both the development community and the private sector have, or have not, been doing. It would appear that neither is willing or able to respond to the magnitude of the energy challenge.

### Direct investment

According to the 2004 World Energy Assessment Update, both Official Development Assistance and foreign direct investment earmarked for energy in developing countries lagged significantly behind what was invested in infrastructure, for example, throughout the 1990s.

Yet there has recently been no shortage of opportunities for meetings and partnership. In 2002, the World Summit on Sustainable Development gave birth to as many as 39 primarily donor-led, energy-related public-private partnerships. This is to be commended – but a closer look at these initiatives would probably indicate that they are mainly about process rather than delivery. This suggests that there is little new on the table, which in turn means that there is unlikely to be more investment or aid to address the energy gap.

So the question remains: how do we attract a greater share of both private and public flows to improving energy access for the poor?

In this debate, business is usually cast as a straightforward source of investment and technology. More private sector investment is indeed needed. But given the scale of the problem and the slow responses of the past, this extra investment is hardly likely to be enough. And if the modern energy gap remains unclosed we are not going to be making poverty history any time soon.

### Basic skills

The experience of the Shell Foundation suggests that business offers another set of assets that can be applied to development – in what we term business DNA and business thinking. This is the set of basic skills and expertise that all enterprises draw on to function and endure.

These rather mundane, non-financial assets can be harnessed to address poverty eradication with tremendous effect. This is particularly true for large enterprises, which generally remain untapped reservoirs of expertise and talent across the ▶

developing world. The ability of corporations to measure risk, survey markets, meet customer needs in terms of price, availability and quality, can all be harnessed for development.

Many donors and non-governmental organisations are now grasping this. For our part, the Shell Foundation began an experiment in 2002 to see if we could find a market-oriented solution to the indoor air pollution which kills 1.6 million poor people every year. This is the largest energy related health hazard faced by the poor, and thus dovetails with the Shell Foundation's charitable remit to develop sustainable solutions for communities at risk of poverty, while staying close to the Shell Group's core competency, energy.

Three years later, we think we have learned important lessons and identified a way of scaling-up our pilot programmes. We managed to sell 200,000 stoves in less than three years across six countries – equivalent to helping one million poor people to reduce their exposure to the pollution – by substituting a donor- or subsidy-led approach for a market one.

## Financially viable

The experiment taught us that there is demand among the poor to buy improved stoves. Knowing this, we set about applying sound and tested business principles to work up a business plan to sell 20 million stoves by 2010 through a combination of grants and loans from donors. This may seem ambitious, and indeed unprecedented for a non-subsidy-led model, but we believe that, if we develop a financially viable approach, we can scale it up to meet the energy needs of a huge proportion of the world's poor people.

In the process, we hope to create a self-sustaining cooking stove industry in every country we target, which will go on providing jobs and livelihoods long after our intervention is complete.

This is, of course, just one example of how business thinking and enterprise solutions can be applied to the energy gap. But if this kind of innovation is to take root there will have to be a new conversation – one initiated by donors willing to listen to the poor people who make up their market and to grasp new ways of meeting their needs.

Some people in some development agencies and NGOs are certainly trying to learn the language of business – and this is good. But they have a long way to go. They are embedded in a system that generally looks primarily to public sector solutions and sees corporations mainly as a source of technology and capital. The value creators within enterprise have no one with whom to have that new conversation.

This explains why so much that passes for Corporate Social Responsibility and philanthropy underperforms in its developmental impact. But corporations can move remarkably quickly compared to the public sector, if they are presented with the right value proposition by the right partner. Much learning needs to be done on both sides. We can all start by immediately initiating a conversation that goes beyond the spend-mentality of donors and the risk minimisation of major investors. There is a clear business and developmental case for the two sides to come together over closing the energy gap ■

*Kurt Hoffman is director of the Shell Foundation.*

*Mark Edwards/Still Pictures*

*Eldon Sweitze/UNEP/Topfoto*

# More is *Less*

**ASHOK KHOSLA** argues that eradicating energy poverty is essential to any effective strategy for stabilising climate change

Most governments drive into the future with only the rear-view mirror to guide them. Despite growing scientific evidence that our present patterns of consumption and production are leading to massive disruption of the planet's life support systems – particularly its climate and its living resources – the momentum of our economies only seems to grow. International treaties have been negotiated to slow this headlong race to self-destruction, but the foot on the accelerator pedal continues to press harder than the one on the brake; the biggest polluters are still the biggest defaulters.

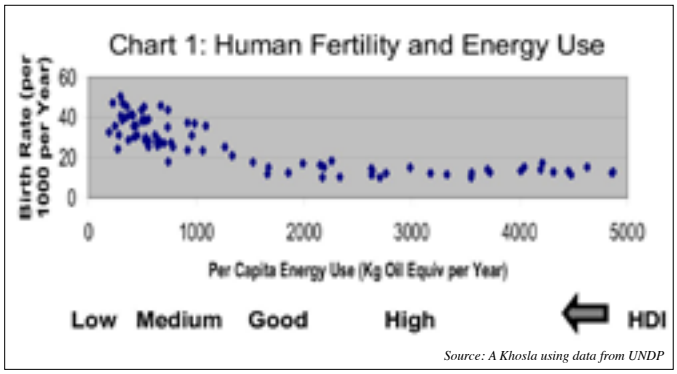
Given the long time lag between cause and effect – the emission of greenhouse gases and changes in atmospheric temperatures – the global climate will be modified no matter how soon the world's economies reduce their fossil fuel use and forest destruction. The legacy of some 150 years of profligate energy and material use will see to that. Much of this change – which will in turn lead to alterations in rainfall, sea levels, frequency of natural disasters and other unpleasant phenomena – is widely considered to be unfavourable, if not outright harmful.

Scientists, environmentalists and diplomats must, of course, work day and night to rectify this and bring about global agreements and national policies that will reduce the future causes of global climate change. But we must now also evolve ways that go beyond the simplistic knee jerk solutions currently being sought by those who have an interest in continuing the status quo.

It is a characteristic of complex societal or natural problems – especially those for which the effect follows long after the cause – that the solutions that actually produce the desired results are not necessarily the obvious ones. The most effective solutions may even be sufficiently counter-intuitive to evoke considerable derision from the experts. So it is with climate change. Responses must be in tune with the time scales of the atmospheric processes that cause it – decades or even centuries.

Of course, we need action now for immediate results, both to satisfy the public that governments and corporations are indeed responding, and because every ton of carbon not emitted is a ton of grief saved somewhere down the road. But even more urgently, we need action now for real long-term results, where the impact will be even greater. The carbon emissions that most urgently need to be controlled are those of the global economy fifty years from now – a world inevitably more democratised and equitable than today, and one, therefore, in which everyone will have the right to demand a much higher level of total energy use.

Counter-intuitive though it might appear, the most effective way to reduce the long term impact of human activity on the climate is to accelerate, as quickly as possible, energy use (or at least the services that energy makes possible) among the planet's poor.



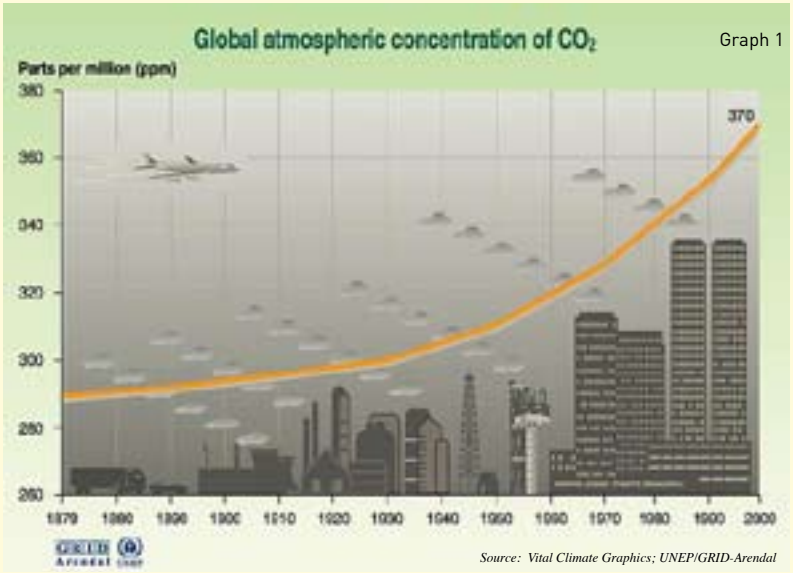
*Source: A Khosla using data from UNDP*

# AT A GLANCE: Climate Change

Atmospheric $CO_2$ has increased from a pre-industrial concentration of about 280 ppmv to about 367 ppmv at present. It is evident that the rapid increase in $CO_2$ concentrations has been occurring since the onset of industrialization.

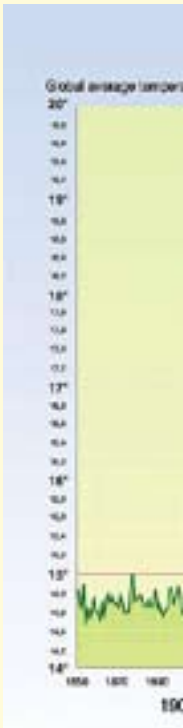
Using the IS92 emission scenarios, projected global mean temperature changes relative to 1990 were calculated up to 2100 (see graph 2).

Although there are inadequate data to determine whether there has been an increase in climate variability or extremes, it can be seen (graph 3) that the economic damages from weather related disasters have increased dramatically.

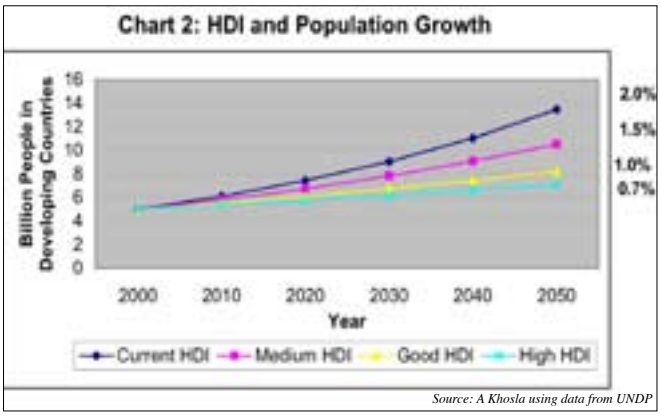


*Source: Vital Climate Graphics; UNEP/GRID-Arendal*

*ppmv= parts per million by volume*



The two primary numbers that will determine the state of the climate in, say, the year 2050 are the global human population and its per capita energy consumption – particularly in the form of fossil fuels. A society's population growth rate is not an independent variable: it is closely related to the level of energy services available to its members. Human fertility has a strong inverse correlation with the state of economic development. The better the living conditions and opportunities available to people,




*Source: A Khosla using data from UNDP*

the lower, generally, the family size. UNDP's Human Development Index (HDI), a widely accepted measure of the quality of life, is highly correlated with availability of energy services. Thus, as Chart 1 shows, improving access to energy services is an excellent way to bring down fertility – whatever the specific causal links may or may not be. Where possible, this should be done by using energy more efficiently – but also, where necessary, by accessing additional primary energy.

The projections shown in Chart 2 give a rough idea of the impact on population growth of improved access to energy services - and therefore of a higher HDI - in the developing countries The curves show the population growth trajectories that can be expected over the next fifty years: they result from using UN population projections with a simple model for how HDI influences fertility. The numbers indicate that the expected global population varies drastically with different energy use patterns

**Table 1: Global Population in the Year 2050**

| HDI in the 3rd World: | |
|---|---|
| If Low HDI (2.0%) Continues: | **13.5 Billion** |
| With rise to Medium HDI (1.5%) | **10.5 Billion** |
| With rise to Good HDI (1.0%) | **8.2 Billion** |
| With transition to High HDI (0.7%) | **7.0 Billion** |

**Business As Usual** ⇨ ***Several Billion Extra People***

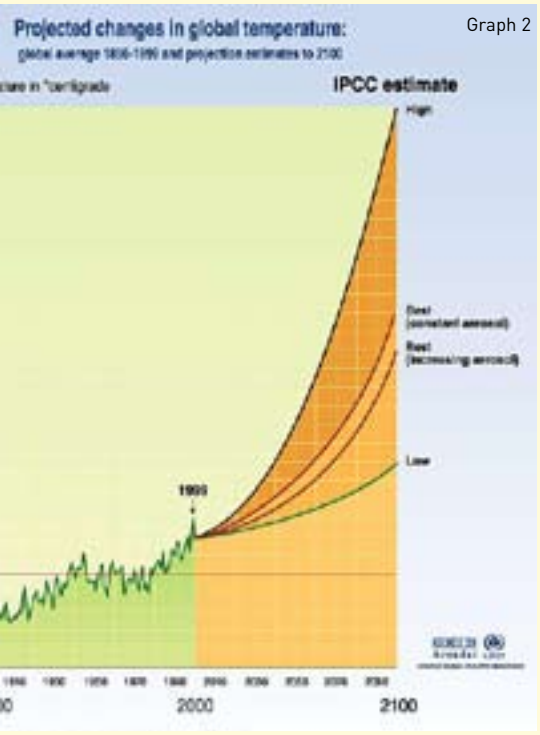
⇨ ***More Carbon Emissions***

*Source: A Khosla using data from UNDP*

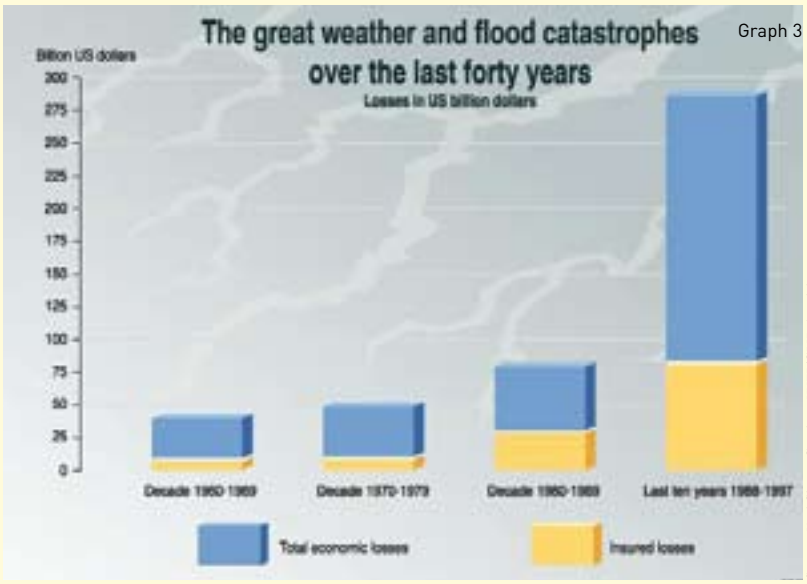
introduced into low-income countries today. As Table 1 shows, the global population, and thus the total annual carbon emissions, would be much lower in, say, 2050 if the demographic transition to low growth takes place – and that needs, among other things, immediate delivery of improved energy services to the poor.

Paradoxical as it may seem, therefore, bringing the energy services available to the poor to a reasonable level – through improving efficiencies and use of renewables and other alternatives, not just by pouring in more raw energy – is the most important intervention required to reduce climate change. It could cut the world's population in the year 2050 by as much as 30 per cent from a potential of around 10 billion, resulting in a huge reduction in carbon emissions ■

*Ashok Khosla is Chairman of Development Alternatives and CEO of TARAhaat.*




*Source: Vital Climate Graphics; UNEP/GRID-Arendal*




*Source: Vital Climate Graphics; UNEP/GRID-Arendal*

Mark Edwards/Still Pictures

# Forming *a Bond*

**DAVID DE FERRANTI** outlines a new proposal for mobilising finance to combat climate change and reduce poverty in developing countries

No single solution, no silver bullet, exists for such global problems as widespread poverty and looming climate change. Experience shows that progress requires efforts on many fronts. Now increased attention is being given to innovative approaches to mobilising and using finance – including a new idea, Global Development Bonds.

If it is to combat climate change, the world needs to transition away from its reliance on fossil fuels towards new systems which use energy much more efficiently and where clean forms of power generation predominate. This will need trillions of dollars of capital investment – but that in turn can be a catalyst for economic development and job creation. One approach – advocated, for example, by the Energy Future Coalition, a US public policy initiative affiliated with the United Nations Foundation – is increasingly to develop and use biomass fuels for transport: these could reduce security risks, improve trade balances, and spur rural development – even as they cut greenhouse gas emissions.

Of course – with close to half the world's people still living on under $2 a day and over a billion on less than $1 – the world also faces formidable challenges on poverty. Developing microenterprises can do much to help the world's poor – those characterised by C.K. Prahalad as the "bottom of the pyramid" – create jobs, earn income, and set themselves on the path out of poverty.

One step higher on the pyramid, small and medium enterprises (SMEs) are also vital to development, but can face huge problems in getting the capital they need. Loans are hard for them to get – and may not help if they are short-term ones when firms need longer-term, "patient" capital in the shape of equity or longer-maturity loans. Venture capital is barely available in most developing countries.

## Huge resources

Tackling poverty, of course, involves more than addressing enterprises' financial constraints. Further progress is still needed in ensuring and sustaining good macroeconomic management – including fiscal, monetary, trade, and exchange rate policies. Countries still have much to do to ensure that the broader environment for developing enterprises and creating employment is conducive to growth and innovation: this involves addressing issues in education, infrastructure, the rule of law, security, regulatory burdens, and many other fields.

Victory on these policy fronts will not happen overnight – though there are signs of progress in many countries. So, while the hard work of development and policy reform is undertaken, it is also essential to explore ways of attracting more capital – and especially more of the private sector's huge resources – to potentially worthwhile investments in developing countries.

Importantly, the techniques being explored – including asset securitisation and credit enhancement – are not abstract notions, but concrete instruments already proven on a large scale in the United States and elsewhere. The objective is to try to extend them to more countries and more types of investments so as to help meet development and environmental goals. One such approach, proposed by the Energy Future Coalition, goes under the label of Global Development Bonds (GDBs).

Local entrepreneurs in India see an opportunity to improve a water supply system, thus helping both farmers and urban water users. Other groups elsewhere see similar possibilities in roads, electricity, housing, and so on. But these projects cannot get funding because local banks lack available capital or cannot take on the risks.

## Social pressures

Suppose, however, that a private global financial institution in, say, New York and London was willing and able to provide much of the needed funding to local institutions. These could, in turn, lend to the project sponsors, creating an initiative that sparks sustainable development and economic growth. ▶

The global institution can intervene because it has raised funds by issuing GDBs. The bonds – supporting a highly diversified portfolio of private-sector project debt – are partially guaranteed by entities trusted by investors, and by the ratings agencies to which they look. Such backstopping reduces the risks and makes the bonds more attractive. The GDBs also package the risks involved in ways that allow more conservative institutional investors, like pension funds, to take the least risky share of the investment – while others take the riskier share and thus get higher compensation.

The backstopping enhancements for GDBs would need to be significant enough to make a difference. The types of risk to be protected against might include currency fluctuations, possible national political changes, policy reversals, regulatory shifts, and/or social pressures. (The business risks would be managed in conventional ways.)

Creative financial engineering in the private sector can handle some of these credit enhancements, but some public backing may also be needed. In the US, for example, this might most readily be achieved by enabling the Overseas Private Investment Corporation (OPIC) to strengthen its support. Other, larger steps could include a joint private/public entity to help re-guarantee GDBs, and/or expanded support through special purpose vehicles or government sponsored entities.

### Sustainable development

The developers of the idea observe that even a modest start could significantly increase financial flows to developing countries. More than $19 trillion are invested in US securities markets each year – 270 times as much as the roughly $70 billion provided in official aid to developing countries annually. If just a few tenths of a per cent of this were to shift to investments in developing countries, it could match or exceed aid. Furthermore, risk mitigation that enabled large institutional investors to join in would have a potentially huge impact. US pension funds alone totalled $7.8 trillion in 2004, US life insurance company assets are $4.2 trillion – and there is a considerable appetite from investment managers for prudent opportunities to support sustainable development.

Much more investigation is still needed to determine the conditions under which GDBs could prove feasible and how exactly they should be designed. Those thinking seriously about them include people with considerable financial market experience and others versed in development and political issues. Term sheets and organisational structures laying out how the concept would work have been prepared, and policy implications are being explored.

These explorations may seem ambitious. But, as a private-sector-led initiative GDBs are politically attractive, and will require only a fraction – if any – of the upfront budget allocations of conventional aid. Earlier major financial innovations, including the development of US municipal bond markets, once appeared visionary. When the emergence of new financial products and markets is blocked by such barriers as information gaps, a push is sometimes needed to break them down and "prime the pump." GDBs could do this for greater flows of private funds to developing countries, and thus help the world meet crucial goals for tackling poverty and addressing environmental challenges ■

*David de Ferranti, a Senior Fellow at the United Nations Foundation, was previously a Vice President at the World Bank.*

# UNEP Sasakawa Prize


The **UNEP Sasakawa Prize** has been redesigned after two decades of recognising and rewarding important environmental initiatives in both developing and industrialised countries. The new phase in its life follows an assessment by **UNEP** and **The Nippon Foundation**, the Prize sponsors.

The focus of the Prize will shift from being a reward for past achievements towards being an 'incentive' for environmental ideas and initiatives that are innovative, replicable, and – most important – sustainable in the long-term. Nominations for the $200,000 Prize will be solicited each year on the basis of the theme chosen for the annual United Nations World Environment Day celebrations, which in 2006 is 'deserts and desertification'.

The Selection Committee – consisting of two environmental experts and a previous Sasakawa Prize laureate, re-appointed each year, plus a representative each from UNEP and The Nippon Foundation – will select a shortlist of five candidates who will be announced on World Environment Day, 5 June, for consideration by the UNEP Sasakawa Prize Jury.

The Jury, consisting of two standing members – the Executive Director of UNEP and Chairman of The Nippon Foundation – and three internationally known personalities respected for their environmental credentials, will select a single winner, who will be announced to the world at the UNEP Sasakawa Prize ceremony, which will be held each year at the Planetarium, at the Museum of Natural History in New York ■

An unprecedented energy crisis besets our world. Crude petroleum prices have hit over $70 per barrel and credible international organisations forecast further increases.

The crisis has winners and losers. Oil company profits have soared, but non-oil developing countries, especially in Africa, have lost out badly. The environment – local, regional, and global – is a big loser too, because there will be more oil drilling, including in areas designated as wildlife sanctuaries and natural world heritage sites. High energy prices accelerate the pace of forest destruction and environmental degradation in most African countries, as households increase their charcoal and fuel wood use. When the environment loses, our planet loses, everyone loses.

# Grasping *the Nettle*

**MERSIE EJIGU** describes the opportunity provided by biofuels for attaining development and energy security in Africa

Society needs energy to survive. The food we eat, the clothes we wear, our mobility – in a word, our livelihood – depend on it. Developed countries may have the capacity to avert the energy crisis, but this is limited or non-existent in non-oil developing countries, especially in Africa. They have to face its huge impact. Africa accounts for 3 per cent of the world's modern energy consumption – the lowest per capita share of any continent, and just half the world average. Yet it has to bear the heavier burden of high energy costs. In many African countries these breed social grievances and political tensions, create conditions for political instability, hamper efforts to reduce poverty, widen income disparity, halt the transition from subsistence to commercial economy, and force women to spend more time gathering wood and less time participating in social programmes and being economically productive.

## Missed opportunities

William Shakespeare once said, "Out of this nettle, 'danger,' we pluck this flower, 'safety'. Historically, crises of the magnitude brought by high energy costs have had two diametrically opposite impacts. Huge cost increases have caused huge human suffering. Yet crises have also offered opportunities for innovation and the emergence of new products and processes. Africa has missed opportunities offered by the energy and drought crises of the past three decades. Now it is left with no choice but to seize the one created by the present energy shock.

Success in creating an 'opportunity' from a 'crisis' depends upon institutional capacity and human resources. Though these may need strengthening in some areas, many African countries have enough of both to turn the crisis to their advantage. Only political will is needed.

## Energy consumption

Africa is endowed with huge amounts of renewable energy. It has the highest average amount of solar radiation each year in the world: 95 per cent of the daily global winter sunshine above 6.5 kWh/m2 falls on Africa. Its hydropower and geothermal power remain untapped – only 7 per cent of the hydraulic and 0.6 per cent of the geothermal energy potential is exploited. Reducing electricity wastage (11.3 per cent compared to the world's average of 9.2 per cent) also offers great potential.

As for consumption, many African countries derive over 90 per cent of their household energy from biomass, such as wood, charcoal, and animal and crop residues. This has a low end-use efficiency: a high concentration of these traditional fuels is needed just to produce a low level of energy. Wood, including charcoal, is perhaps the most environmentally detrimental biomass energy resource. The environmental and health concerns of Africa's biomass-based energy consumption are compounded by the world's highest leaded fuel consumption. Twenty-two of the 49 countries in sub-Saharan Africa only use leaded fuel, with 13 solely using unleaded and 14 with a dual system.

Africa must shift from traditional to modern sources of energy, improve conservation, harness its largely untapped ▶

*Didier Consta/UNEP/Topfoto*

**As for consumption, many African countries derive over 90 per cent of their household energy from biomass, such as wood, charcoal, and animal and crop residues**

renewable energy potential, and reduce dependence on fossil fuels.

Our first effort must focus on developing a comprehensive energy strategy that includes a clearly stated investment and macroeconomic policy direction and addresses all the key issues – production, trade, consumption, and research and investment in renewable energy. This must be fully integrated into national development strategies, such as ones for reducing poverty.

Second, investment in biomass must be substantially increased. As the primary source of household energy, it deserves better recognition and greater investment. This could, for example, involve increased tree planting by households, communities and governments. In most African countries, years of land degradation and deforestation have resulted in reduced vegetation cover, soil nutrient depletion, and dwindling biomass density. Indeed, investment in tree plantation is cheap, as planting can easily and routinely be done. Yet, it offers quick and high investment returns, helps curtail environmental degradation, and mitigates climate change through expanding carbon sequestration. At the same time, efficient use of energy by households must be promoted: reducing energy wastage here through providing energy saving technologies is a vital component of the new renewable energy revolution.

Third, equally important, is to promote investment in biofuels – liquid transportation fuels derived from such plants as grass, sugar cane, corn, palm oil, rapeseed, and castor seeds. Biofuels substitute for expensive petroleum and are biodegradable and non-toxic. They replace lead to enhance octane rating. They increase farm income, create jobs and offer the least-cost way of attaining energy security. They burn more cleanly, with lower emissions than fossil fuels. They help curtail environmental degradation and mitigate climate change through expanding carbon sequestration. And they reduce dependence on expensive imports while diversifying, broadening and augmenting exports. There is considerable potential for extensive adaptation and use of biofuels through increasing investment in growing trees and bushes that can produce them. Africa, of course, is a food-deficit continent, and so it is important to ensure that producing biofuels avoids competition with food sector production. Biofuel technology is fast expanding towards non-food crops, and towards soil-enriching, high-yielding, less moisture-requiring, and more energy-efficient plants.

### Renewable energy

Fourth and last, we must establish market and fiscal policies that promote renewable energies, stimulate private/public partnerships, and develop markets that consumers can easily access to obtain the renewable energy resources and services they need.

The livelihoods of many Africans are already threatened by environmental and energy scarcity arising from land degradation and deforestation. High crude petroleum prices, combined with Africa's heavy dependence on biomass energy, imply further deterioration in living standards and, perhaps, the breakdown of the social fabric. Yet, despite the human suffering it has caused, the energy crisis offers us a huge opportunity to rethink and redesign energy policies.

The new energy policy should be comprehensive and environmentally sustainable, encouraging public, private, community and farmer level investment in renewable energy sources, and, particularly, in reforestation and biofuels. It should not be a stand-alone policy, but an integral part and priority of the national development policy, the national poverty reduction strategy and trade policy. Indeed, reforestation and biofuel production are development imperatives that create possibilities to improve the quality of life, raise rural incomes, create jobs and improve the local and global climate. And everyone – poor and rich, young and old, men and women – can be mobilized to plant trees and produce biofuels, thereby contributing substantially to attaining energy security, and sustainable peace and development ■

*Mersie Ejigu – previously both Minister of Development Planning and Minister of Agriculture and Natural Resources of Ethiopia – is Founder, President and CEO of the Partnership for African Environmental Sustainability (PAES) and Senior Fellow at the Foundation for Environmental Security and Sustainability.*

# *Positive* Dynamics

**DANIEL DE LA TORRE UGARTE** shows how sustainably produced bioenergy can contribute to a new energy paradigm that will alleviate poverty, combat climate change and enhance energy security

Biomass is receiving increased attention as a renewable substitute for fossil fuels. When developed sustainably and used efficiently, it has the potential to generate income, employment, and economic growth in developing countries. It can also help address environmental problems ranging from desertification to climate change and play a major role in economic development strategies.

Modern energy services – heat, electricity and transportation fuel – are essential for economic advancement and for breaking the cycle of poverty. The Kyoto Protocol's Clean Development Mechanism offers an additional economic incentive for developing bioenergy in developing countries. All this points to a new energy paradigm in which combating climate change and poverty alleviation are mutually supportive – and demand international policy coherence.

**Greater prosperity**

Bioenergy derived from sustainable agricultural practices enables developing countries to use their resources and attract the investment needed to accelerate sustainable development. The potential advantages are both environmental and economic. Environmental benefits include reducing greenhouse gases, improving soil productivity and helping degraded land to recover. The economic benefits will come from increased rural economic activities and greater prosperity resulting from improving access to energy services and enhancing their quality.

Brazilian experience – dating back to the Alcohol Programme of 1980 - shows it is possible to achieve sustainable and economic ethanol production. It is economically viable in Brazil, without any government support, at oil prices above US $35 per barrel. The experience, based on the use of sugarcane, is transferable to other countries.

**Efficient distribution**

The potential contribution of modern biomass to a new energy paradigm is significant indeed. The world consumes about 400 EJ (exajoules) of energy per year, generates the equivalent of about 100 EJ of largely unused crop residues annually, and could produce another 180 EJ from energy-dedicated grasses and trees. However, the size of bioenergy's ultimate contribution depends on the use of sustainable agricultural practices, land use consistent with the food needs of local and global populations, and technically and economically efficient distribution and conversion of feedstock into energy. Thus bioenergy should be viewed not as the replacement for fossil fuels, but as one element of a portfolio of renewable energy sources.

**Modern energy services – heat, electricity and transportation fuel – are essential for economic advancement and for breaking the cycle of poverty**

Producing energy from biomass involves a range of technologies, including solid combustion, gasification, and fermentation. These produce liquid and gas fuels from a diverse set of biological resources – traditional crops (sugar cane, corn, oilseeds), crop residues and waste (corn stover, wheat straw, rice hulls, cotton waste), energy-dedicated crops ▶

(grasses and trees), dung, and the organic component of urban waste. The resulting bioenergy products provide multiple energy services: cooking fuel, heat, electricity and transportation fuels.

**Economic development**

This very diversity holds the potential of a win-win-win development path – for the environment, energy security, and social and economic development. Taking the opportunity requires coherent and mutually supportive environmental and economic policies to encourage the emergence of a globally dispersed bioenergy industry pursuing a path of sustainable development.

Bioenergy's potential to reduce global greenhouse gas emissions varies, depending both on the methods used to produce the feedstock and on the technology used to convert it. Ethanol produced in industrialized countries from corn, for example, may reduce life-cycle greenhouse gas emissions only by 10-30 per cent compared to oil, whereas ethanol produced from sugar cane or cellulose may cut them by 90 per cent or more. In both cases, greenhouse gas reductions increase dramatically with agricultural practices that enhance soil carbon sequestration and are less intensive in using petroleum-based fertilizers and fuel. This is especially significant for bioenergy-dedicated grasses and trees, as their production is characterized by a relatively low use of fertilizer and other petroleum-based products.

*Didier Constat/UNEP/Topfoto*

**Significant gains**

Bioenergy brings other environmental benefits when high intensity agricultural techniques shift towards conserving and producing native perennial grasses. There can be significant gains in reducing erosion and the leaching of chemicals, and in improving water quality. Even countries that do not produce biofuels benefit, as improvements in air quality and reduced reliance on fossil fuels help everyone.

Access to energy services is clearly linked to development and to alleviating poverty. They are needed first to satisfy basic human needs – fuel for cooking and heating, energy for pumping water, and electricity for health and education services – and, secondly, to provide energy for income-generating activities that help break the poverty cycle.

**Sustainable management**

Moving from using traditional biofuels – direct burning of wood for cooking and heat – towards modern ones such as electricity and ethanol, can directly impact the quality of life of two billion people by improving indoor air quality, providing additional energy services for development, and allowing sustainable management of natural resource.

Diversifying energy resource is a key motivation for developing biofuels for many countries – but opportunities for rural development must also be a key priority. The benefits to rural development from a dynamic bioenergy sector begin with feedstock production. Agricultural production in many developing countries is labour-intensive, so more demand for agricultural products will increase employment and wages, while the additional income generated can have significant multiplier impacts when it is spent by the rural population.

Producing bioenergy dedicated crops and using residues from food and feed grains would both provide the foundation of a bioenergy industry and directly support and enhance the production of crops that increase food security. Satisfying needs for both food and energy could lead to more efficient use of land and rural resources when the way they complement each other is recognized.

**Positive impacts**

Construction and operating bioenergy production facilities – which have to be located in rural areas, close to where the feedstock is grown – will generate additional economic activity there. Transporting the feedstock to the plant and distributing the fuels produced will also benefit rural areas.

These positive impacts in the dynamics of the rural economy could substantially help to reduce the traditional exodus towards urban areas, helping to create the critical mass needed for investment in education, health, and other public infrastructure.

Thus biomass resources offer an opportunity for a win-win-win for energy, climate change, and poverty alleviation, so long as its feedstock is produced and used sustainably ■

*Dr. Daniel De La Torre Ugarte is an Associate Professor of Agricultural Economics and Associate Director of the Agricultural Policy Analysis Center, University of Tennessee.*

# Star Profile: Wyclef Jean

Christopher Columbus said he had "never beheld so fair a thing" as Haiti's forests when he sailed across the Atlantic to the so-called New World. He called the land "fertile and beautiful" and "most suitable for the planting of crops and for raising cattle." Sure enough, in the 18th century it produced 40 per cent of the sugar and 60 per cent of the coffee consumed throughout Europe.

But now both the trees and the wealth are a distant memory. Environmental destruction has devastated the country. Ninety-eight per cent of its tree cover has been felled and two-thirds of its farmland destroyed.

"Haiti is the poorest nation in the Western hemisphere," the two-time Grammy Award winner, Wyclef Jean, told Our Planet . "A mere 200 years ago, it was the richest. Think of that."

Jean – born the son of a minister in Croix-des-Bouquets near the country's capital Port au Prince 33 years ago – moved with his family to Brooklyn, New York, at the age of nine. At 15 he joined a rap group that became the award-winning Fugees, named for the slang for Haitian refugees. After a world-beating career, both with the group and as a solo star, "the time came to give back to my home country."

Seven years ago he set up the Wyclef Jean foundation, which raised money for the country. Then, in January this year, he created Yéle Haiti – Yéle means freedom – to work for sustainable development in education, health, humanitarian assistance, and the environment.

"Really the environment affects everything," he said. "People are so poor there, many even have to eat dirt. If we build up the land, people can farm and earn a living. We need to plant trees."

Yéle Haiti has been a catalyst in launching a new national association of NGOs called Vert Espoir ('green hope') to undertake a major tree planting campaign in Haiti, joining with the Kenyan Nobel Peace Prize winner, Wangari Maathai, and her pioneering Green Belt Movement. Yéle Haiti's direct project will be to set up 50 community-based tree nurseries and to reach some 600,000 young people through hip-hop music.

"The idea is to combine music and development," he said. "It's a new way of doing things. No-one else is doing it like this. We have to invest in the kids – they are the future of the country. Because music is my life, because I was blessed with this talent, because I am in a position to make a difference for Haiti, music is the central element for the projects."

So, for example, Jean has enlisted hip-hop musicians from the communities to distribute food in two gang-controlled neighbourhoods - "said to be the most dangerous in the world" - that outsiders cannot enter. He has written songs for them to promote the importance to public health of cleaning up rubbish, and he is planning a 'Hip Hop Caravan', where musicians will attract crowds for HIV testing.

"I have seen my country in a state of emergency all my life," he said. "My dream for Haiti is to get it out of the level of poverty that it is in. Haitians have so much pride, so much to give, but right now there's little support for them in any form.

"Haiti was not really on the world's radar. Because I'm a celebrity, it brings more attention and awareness to the situation in the country. I'm committed to Haiti. I'm committed to Yéle Haiti and I'm willing to do everything I can to make things better for my country." **GL**

# Sunny Path from *Poverty*

**MICHAEL ECKHART** describes an innovative way of financing clean energy development

*Mark Edwards /Topfoto*

For many years the clean energy community has searched for innovative ways of financing clean energy projects. Many new approaches have been tried, but we are now realising that there are no magic solutions. We usually find that the task is less about bringing the financial community into the realm of clean energy than about bringing the clean energy community into the realm of mainstream finance, with a few new elements.

### Capital intensive

Several key characteristics about clean energy solutions affect their financing. First, clean energy projects are typically more capital intensive than conventional alternatives, with higher initial costs and lower operating ones, making them more sensitive to the term of debt and interest rates. Equally important, they are more exposed to concerns about political risk, currency devaluation and other international issues, because it takes longer to recover capital. Here, innovative work with the mainstream financial community includes the proposed Global Development Bonds (GDBs) that might some day link sustainable development projects in developing countries with finance from institutional investors in developed ones like the United States. This is a long bridge to build, but progress is being made.

Second, clean energy development creates environmental benefits that are difficult to translate into returns to the project's investors and lenders. Society is just beginning to create mechanisms by which those public benefits can be turned into cash – and thus included in financing arrangements. Carbon Credits based on implementation of the Kyoto Protocol, and Renewable Energy Credits created by regulatory mandates and voluntary markets are both examples of these. In certain situations, their value has actually exceeded that of the electricity produced. The challenge is how to establish markets for these instruments so that the financial community can have confidence in their longer-term values.

Third, clean energy projects are often smaller scale than conventional ones, with attendant high transaction costs per unit of output. SolarBank is an effort to address the issue of scaling the financing programme to a large number of very small transactions.

Solar photovoltaics (PV), which convert sunlight into electricity with no pollution, are already being used to provide the first electricity to off-grid homes, lifting people from poverty by providing light, access to communications, and economic opportunities. The difficulty is that their initial cost is high, requiring financing in about 95 per cent of cases. However, bankers do not lend money for tiny power plants, and utilities don't lend at all. Yet the scale of the market is huge: at about $500 per installation, all the 400 million un-electrified homes in the world can be powered by PV for $200 billion. This is an enormous challenge, especially considering the transaction costs of so many small financings. There must be a way of making funding this new opportunity more efficient.

### Government incentives

SolarBank is a proposed global wholesale fund that would make loans to existing retail lenders that service rural people – banks, rural banks, microfinance organisations, cooperatives, societies, and other forms of lenders. It would have several characteristics:

It would be the "specialty" fund that lends perhaps $2 billion over its life, but in the process becomes the expert that the mainstream lenders emulate, thus leveraging its impact to mobilize the entire $200 billion needed.

It would offer an array of technical support and guidance programmes to help ensure that participating lenders are successful – including education, training, quality assurance, vendor qualification, technical support, insurance programmes, and peer-to-peer learning through participation in a SolarBank global network of lenders.

It would provide an efficient mechanism for making government incentives and subsidies from OECD donor countries flow to millions of end users.

SolarBank would be a not-for-profit, socially-responsible specialty fund, aiming to achieve a societal goal in a financially prudent way. It would require highly efficient, low-overhead operations, along with outstanding corporate leadership, financial skills, and technical excellence.

Its motto is simple: "the path from poverty begins with the first kilowatt-hour." Solar energy can provide the first kilowatt-hour of electricity to all who now lack it, and SolarBank can be a key part of a global strategy to achieve this ■

*Michael T. Eckhart is President, Solar International Management, Inc. and President, American Council on Renewable Energy (ACORE).*

Rubsaart/UNEP/Still Pictures

# *Perfect*

# Financial Storm

**MINDY LUBBER** describes the rising threat to insurers and their customers from climate change

Hurricane Katrina was a poignant reminder that insurers, governments and consumers are at enormous risk from escalating losses from hurricanes and other weather-related events. While no one storm can be attributed to global warming, rising global temperatures are likely to cause significant increases in severe weather events – such as hurricanes, floods, hailstorms, wildfires, droughts and heat waves – in coming decades. Unless insurers and their regulators take steps to address this growing challenge, companies, governments and the public will suffer even greater financial losses in the future.

Insurance is threatened by a perfect storm of rising global temperatures, rising weather losses, and more people than ever living in harm's way. Insurers and regulators have failed adequately to plan for the weather events that scientists predict will intensify with global warming.

**Increased restrictions**

As it happens, the U.S. National Association of Insurance Commissioners (NAIC) was planning to discuss the implications of climate change on the insurance industry at a meeting scheduled for September in New Orleans. Katrina forced its cancellation and the discussion is now slated for December in Chicago.

Even before Hurricane Katrina, consumers and businesses in many parts of the United States were seeing higher premiums, lowered limits and increased restrictions in coverage due to rising weather-related losses. Now a new report commissioned from three insurance industry experts by Ceres – a US-based network of institutional investors, companies, and environmental organisations – has warned that if present trends continue, the availability and affordability of insurance will be at even greater risk for homeowners and businesses. State and federal governments can also expect more financial liability as they increasingly become "insurers of last resort" as private insurers further restrict coverage and withdraw from more markets.

**Economic impacts**

The report cites a 15-fold increase in insured losses from catastrophic weather events – those with over $1 billion of damages – in the past three decades. The number of weather-related events and their economic impacts are increasing. Global insured and total property losses – $45 billion and $107 billion in 2004, respectively – are rising even faster than premiums, inflation, population or economic growth. Individual insurers from four continents have organised under the United Nations Financial Services Initiative, expressing concern about climate change: firms from Australia, Austria, Canada, ▶

France, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Russia, South Korea, Spain, Sweden, Switzerland, Thailand, and the United Kingdom are all involved. Most notably, reinsurers Munich Re and Swiss Re have begun to explore how climate change will affect their investments and the policies they cover.

Some US insurers and other industry players have also expressed concern, but the American Insurance Association (AIA) viewed the threat from global warming as a relatively minor issue in a brief paper prepared in 1999, and no U.S. primary insurance trade associations have taken public positions or made recommendations, until now. The December meeting will mark the first time the US insurance industry fully examines the effect of climate change on its business.

Many studies predict that rising global temperatures from higher emissions of greenhouse gases (GHGs) will increase financial burdens for insurers globally and in the United States. A 2004 report by the Association of British Insurers concluded that a high GHG emissions scenario (where carbon dioxide levels double from today's levels, as predicted by many leading climate models) could require insurers to boost their capital requirements by 90 per cent, leading to substantially higher premiums and other adverse consumer impacts. Losses under a low-emissions scenario (carbon dioxide levels 40 per cent above today's levels) were only one-fifth as high.

**New challenges**

Weather losses are becoming more unpredictable, especially as insurers from the U.S. and other industrialized countries move aggressively into rapidly emerging markets such as China and India, which pose additional risks. With growth rates triple those in industrialized countries, premium volume from the developing world will represent half of the global total in the next few decades. Lack of building codes and other factors make them vastly more vulnerable to the costs and other impacts of climate change.

The following actions, among others, are required:

- Insurers need to: collect more complete data on weather-related losses; incorporate climate modeling into their risk analyses; analyze the implications of climate change on their business and investments and share the results with shareholders; and encourage policy action to reduce greenhouse gas emissions.
- Regulators need to: include climate risks in company solvency and consumer-impact analysis; review the "standards of insurability" to identify new challenges, including climate-related hazards; encourage insurers to collect more comprehensive data on losses; elevate standards for catastrophe modelling; and assess exposure of insurer investments and adequacy of capital and surplus to extreme weather events.
- Governments need to: foster and participate in public-private partnership for insurance risk spreading; comprehensively assess their overall financial exposure to weather disasters; reduce vulnerability to disaster losses through improved early warning systems, land use planning and other measures; and – in China, India, the United States and Australia – take policy action to reduce greenhouse gas emissions.

Joel Ario, the Oregon State Insurance Administrator and Vice President of the NAIC, believes that insurers need to do more to assess their growing risks and financial exposure from climate change. "The insurance industry plays a vital role in identifying and quantifying catastrophic risks so that appropriate loss prevention and risk-spreading measures can be put into place," he says. "Reinsurers who provide a backstop on large losses are engaged on the climate issue, but much more work needs to be done by the primary insurers whom consumers rely on when catastrophes hit."

Though insurance companies have been slow to grasp the significance of global warming, institutional investors are leading the way in addressing it. Jack Ehnes, chief executive officer at the California State Teacher's Retirement System – at $118 billion, one of the United States' largest pension funds – says "investors are increasingly more concerned about the financial risks posed by climate change, and our interest is especially strong for an industry that is so directly exposed to the physical impacts of global warming. Insurers must take active steps to understand and assess these daunting tasks." ■

*Mindy Lubber is the president of Ceres, which directs the Investor Network on Climate Risk (INCR), a network of more than 50 institutional investors in the U.S. and Europe collectively managing over $2.7 trillion of assets.*

*UNEP/Still Pictures*

# PEOPLE

**Jonathan M. Hutton** has been appointed Director of the UNEP-World Conservation Monitoring Centre by Klaus Toepfer, Executive Director of UNEP. Previously Regional Director of the Africa programme of Flora and Fauna International, he has had a distinguished career in wildlife conservation and natural resources management spanning over 20 years in government services and the private sector.

**Maude Barlow** and **Tony Clarke**, campaigners for water rights for the poor, are among four winners of this year's Right Livelihood awards, to be presented in the Swedish Parliament in December.

The Canadian campaigners, who have embraced many causes over the years, have recently focused on water resources. working with a network of activists in developing countries. An important part of their work has been visiting and assisting communities struggling for water rights.

Barlow – long a high-profile leader in the Canadian women's movement, and an adviser on women's issues to **Pierre Trudeau** during his premiership – played an important part in a successful campaign for a constitutional amendment in Uruguay, adopted by referendum, which enshrines piped water and sanitation as a fundamental human right and lays down that social considerations should take precedence over economic ones in creating water polices. She is now deeply involved with an international campaign for a UN Convention on the Right to Water, building on the new Uruguayan legislation.

Clarke – who has worked on a wide range of social justice issues – has worked closely with Barlow for many years. His latest book, *Inside the Bottle*, highlights concerns about the bottled water industry and its impact on the water resources of the poor.

They share the 2 million Swedish kronor award with **Irene Fernandez** and the organisation First People of the Kalahari and its founder **Roy Sesana**. As Chair of the Pesticide Action Network in the 1990s, Fernandez worked to include the gender dimension of the issue, making visible the previously little-noticed women farmers of Asia. This also led her into campaigns on health, GMOs and control of seeds. More recently she has campaigned for the rights of migrant workers in her country, Malaysia. Sesana, a Bushman, and his organisation were given the award for "resolute resistance against eviction from their ancestral lands, and for upholding the right to their traditional way of life."

The 2005 Honorary Right Livelihood Award is to go to the leading Mexican artist, **Francisco Toledo**, for "devoting himself and his art to the protection, enhancement and renewal of the architectural and cultural heritage, natural environment and community life of his native Oaxaca." ■

The secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) has announced, with deep sorrow, the death of its Executive Secretary **Joke Waller-Hunter**. Ms Waller-Hunter, from the Netherlands, was the UN's first Director for Sustainable Development from 1994 to 1998, and was then Director of the Environment Directorate of the Organisation for Economic Cooperation and Development (OECD) until joining the UNFCCC, where she oversaw the entry into force of the Kyoto Protocol.

Kofi Annan, the Secretary-General of the UN, called her "a firm believer in the principles of sustainable development", adding that she "knew that global cooperation was essential to advancing that cause."

# Electrifying *the Market*

**SUZANNE MAIA** describes an innovative and effective approach to bringing energy to the rural poor

● An estimated 12 to 20 million poor Brazilians have no access to electricity. Yet conventional attempts to provide it have been delayed and provide energy that is limited both in quality and quantity. And they fail to address how the rural poor will pay their electricity bills even at subsidised costs.

● Eleven years ago, the Brazilian Government established a programme to use renewable energy to meet such unmet demand for electricity and to replace costly diesel-fuel generation throughout the country. It wanted to use locally available sources to produce energy in areas beyond the electricity grid, thus meetings its environmental, social and economic development objectives.

● Within three years officials running the programme realised that they could not make their projects sustainable or find a viable way of supporting renewable energy resources, other than the use of photovoltaics in remote areas. Other organisations – whether state, national or international – were faring no better in establishing a viable market base for renewable energy technologies and services.

In mid 2002 a new project – funded by the United Nations Foundation, with co-funding from InWEnt of Germany, the Brazilian State of Mato Grosso and technical cooperation from UNDP – was launched to jumpstart a key priority of the Government's, the development of Regional Market Managers (RMMs). Under this concept, voluntary consortia of private local organisations, with complementary strengths, work together with others to help consolidate sustainable renewable energy markets in their regions, bridging gaps between supply and demand.

This management model has been one of two critical features in the success of the project, which is executed by the NGO, Brasil Sustentavel (BRASUS) in four rural areas of Mato Grosso, with sparse populations of poor people that need energy to develop economically, socially and in an environmentally sound way. The other has been its methodology which, though systematic, is extraordinarily flexible in adapting to local needs and characteristics, as interpreted – in a democratic and participatory way – by local stakeholders. It also makes the markets sustainable by ensuring the sustainability of the goods and services that will use the energy, and the local organisational capacity to continue this and other initiatives.

The vital elements that simultaneously weave together the fabric of this sustainability are: collecting, organising, evaluating and disseminating information to market participants; using this information to organise markets; establishing adequate business models and market approaches that give practical, direct support for developing technically and financially viable business plans for both producers and consumers of renewable energy; ensuring appropriate technology transfer; training and capacity building; setting up a locally adapted financial mechanism that responds to the needs of its rural consumers and the small and micro renewable energy enterprises that supply them; and transferring tools for planning, management, monitoring and supervision, along with the knowledge of how to use them.

The project ensures that its activities have win-win results for all participants. This generally means using technologies, at least initially, to implement or expand viable economic activities that add local value. Each element is integrated to ensure that it has positive, or at least neutral, effects on the others. Thus promoting greater agricultural productivity – through training, technical assistance, monitoring and access to credit – enables poor farmers to follow more environmentally sound practices while increasing productivity and their incomes. This in turn reduces deforestation, better preserves water resources, reduces waste and pollution, improves public health and stabilises families in the region.

The project has already had strong, concrete results besides contributing positively to side benefits such as a sense of community.

- Renewable energy projects, including two small enterprises, have been financed and implemented through a Revolving Fund created by BRASUS with $200,000 start-up capital from UNF. The first repayment to the fund was made in July 2005;
- 19 private sector organisations are members of RMMs in the four regions. They have been fully supporting the RMM operational costs since January 2005, and are supported in various ways by at least 10 public sector agencies;
- A new environmental and sustainable development institute was created from the RMM in one region, and an existing environmental/sustainable development NGO has adopted the RMM in another;

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- Two agricultural cooperatives and a farmers' association were resuscitated, largely thanks to the project's ability to draw supporting organisations together. They now provide critical leadership in their regions, with local partners, in advancing new development initiatives;
- The capacity of RMM members and their partners for building markets, networking for and developing supplementary financial, technical, human and logistical resources has evolved very satisfactorily. After 27 months they were able to operate independently of project resources;
- At least 20 private local commercial enterprises have provided direct financing or credit to farmers in the project, indicating the opportunities it offers them and its impressive impacts in building cooperative efforts to promote local development;
- At least $100,000 have been mobilised in non-project resources to invest in productive activities applying renewable energy technologies, and an additional $110,000 business loan from other sources was directed to RE enterprises operating in the market regions;
- The number of local renewable energy enterprises directly involved has increased from three to eight, showing that they have understood both how they can benefit from the awakened market and the need to keep it growing;
- In the project's third year, local RE enterprises sold at least 45 renewable energy systems – valued at around $50,000 – independently of the project's Revolving Fund, indicating a significant rise in demand, thanks to the way the project's activities have stimulated the market for both suppliers and consumers;
- The four regions reported an estimated 94 potential projects in the pipeline for the year 2005-2006 – including photovoltaic, solar thermal, and micro hydro-systems, and bio-digesters – and a potential for at least 200 annually beyond then;
- Municipal governments have provided technical assistance to farmers for optimising production practices, improving roads to increase access to markets and for project activities, giving logistical support and helping with operational costs for vehicles and tax payments;
- The renewable energy technologies are mainly replacing or avoiding the burning of diesel – and its emissions of greenhouse gases and other pollutants – with an enormous potential for much greater reductions;
- Over 1,200 rural farmers, local entrepreneurs, technical specialists, municipal and state government representatives, RMM members, and other participants from rural worker unions, academic institutions and NGOs have received training through the project.

The RMM model and project methodology – with their focus on local participation and adaptation – are well suited for replication in other areas that meet their basic criteria. Neighbouring municipalities in Mato Grosso are showing interest, as is the State Government itself. This year RMM replication occurred in the northeastern state of Piaui, one of the poorest in Brazil, with support from InWEnt, several private entities, and the host municipal government. So far this is succeeding well – and proceeding even faster than in Mato Grosso – with local resources and market participants strongly engaged.

BRASUS estimates that a solid basis for replication in other regions requires approximately $150,000–200,000 in technical cooperation funds for organisational, market studies and training activities. Mato Grosso's revolving fund becomes self-sustaining with approximately $450,000 in capital, and can be extended to cover other regions with minimal adaptation. Alternatively, new revolving funds could be established, at a cost of only 5 - 10 per cent of initial fund capital. Though the model is intended for regions with at least minimal market development potential, the effects of implementing it are expected to influence even the poorest or most scattered rural populations ■

*Suzanne Maia is founder and President of Brasil Sustentavel (BRASUS), meaning 'sustainable Brazil.*

*Mark Edwards/Still Pictures*

# BOOKS & PRODUCTS

Deserts and desertification is to be the theme of this year's **Children's Painting Competition**, an element of UNEP's **TUNZA** programme for children and youth. Young artists are invited to enter the contest - organised by UNEP, the Japan-based Foundation for **Global Peace and Environment (FGPE), Bayer AG** and the **Nikon Corporation** - which has been held annually since 1990, receiving a total of 160,000 entries from over 100 countries. The chosen subject reflects the theme both of a special International Year in 2006, and of next year's **World Environment Day**, on 5 June.

UNEP

Iskeren Rumenov Petrov, 14 years, Bulgaria

Children who will be between the ages of 6 and 14 years on World Environment Day 2006 are invited to submit their paintings to their respective Regional UNEP Offices by 20 January; these will each send at least 100 of them to a panel of judges, representing the organisers. There will be a winner for each region of the world, to be announced in April, and a global winner to be announced on World Environment Day.

The regional and global first prize winners will receive a cash prize and a trip with their chaperones to the **2006 World Environment Day** celebrations where they will be honoured in a special ceremony, sponsored by **Bayer**. The winning paintings will be exhibited at several venues in Japan and other countries. Past painting entries have featured on UNEP posters, post cards, and calendars, in UNEP publications and in global environmental magazines. All paintings submitted will be stored in the **National Museum of Ethnology in Osaka, Japan**, which is supporting this year's competition along with the the **Japanese Ministries of the Environment, Foreign Affairs, Education, Forestry and Fisheries**, and the **Japan-Arab Association.**

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**WE magazine**, which focuses on travel and the environment for Asian corporate readers and consumers, celebrates its fifth birthday in December. The magazine – which has increased its circulation to 45,000 – features stories on travel, "written with our eyes and ears close to the field", protecting wildlife habitat and local culture. It covers such issues as the latest environmental technologies, animal welfare and habitat conservation and has published articles on subjects as diverse as Chinese buses running on hydrogen, climate change in the Arctic, and the work of Kenyan Nobel peace prizewinner, **Wangari Maathai**.

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While hybrid cars have got ever more popular, a hybrid train locomotive – dubbed the **Green Goat** – is on track to save huge amounts of energy on the rail roads. **Union Pacific Railroad** – the largest in North America – has recently ordered 98 of the engines from its developer, **RailPower Technologies**. The locomotives – used in freight yards where vast amounts of energy are consumed in constant stopping and starting – have diesel-electric engines which reduce fuel use by up to 80 per cent, and emissions of nitrous oxides and particulates by up to 90 per cent.

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Top international decision-makers have joined to produce a groundbreaking book, **Human & Environmental Security: an Agenda for Change** , published by **Earthscan**. Edited by **Felix Dodds** and **Tim Pippard** – with a foreword by **Klaus Toepfer**, Executive Director of UNEP – it tackles the global human security problems across the range of core issues, including terrorism, nuclear proliferation, access to water, food security, loss of biodiversity, and climate change. Its authors – who include **Anna Tibaijuka**, Executive Director, UN Habitat; **Melinda Kimble**, Senior Vice-President, UN Foundation; **Hilary Benn**, UK Secretary of State for International Development; **Noeleen Heyzer**, Executive Director, UN Development Fund for Women, and **Jan Pronk**, UN Special Envoy to Sudan – identify the causes of insecurity, articulate linkages, and outline an agenda for engaging stakeholders from across the globe in building the foundations of genuine and lasting human security.

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# Restoring the Earth

What happens today will change the earth forever. Extinction and the loss of biodiversity provide just one reason why we must treat our environment with more care, and help restore the Earth.

In Australia, as in other countries, invasive species of introduced plants, animals and fish, which have no native predators, have multiplied with devastating effects on soil, native vegetation and wildlife. Many animals are suffering great harm due to such introduced species as the European red fox and the blackberry bush. The mountain pygmy possum, for example, is threatened with extinction because blackberry bushes have destroyed most of the trees on which it feeds.

Many people have now realised the importance of biodiversity and contributed towards helping restore their natural environment: but once an animal or plant becomes extinct then the biodiversity in that region becomes unstable, threatening many other species.

There is also an increasing demand for and decreasing supply of fresh water. Most of Australia's water storage facilities have been only between 40 and 50 per cent full in the past few years and much of its east coast has had water restrictions for the past two. In addition, the country has a major problem of rising soil salinity.

Waste, and where we put it, is another major issue. Increasing amounts go to landfill, including massive amounts of e-waste. Much ends up in rivers and the oceans. The Yarra River in Melbourne, near our homes, is polluted with rubbish, including cigarette butts, general litter and dog waste floating in it. It is the same in Port Phillip Bay, where the river flows to the sea.

It is very important to help others to understand environmental issues and what they can do about them. Every piece of rubbish that is recycled, for example, helps reduce landfill waste.

We ourselves have been liaising with local government leaders including the Mayor and Council of Melbourne and the Deputy Premier and Minister for the Environment of Victoria. The council is sponsoring some of our ideas, such as planting native species and weeding invasive ones, cleaning beaches, and creating plastic bag free zones – beginning with our local shopping strip.

Can we really leave this Earth in a state where our descendants will have to clean up our mess? Imagine living in a world where you could not see and interact with things we take for granted like forests, native animals and the stars, where the only place to view such wonders was in old pictures, movies and the zoo.

We must all work together for the environment. What we do today will help conserve our future.

Every action, no matter how small, will help our environment and biodiversity. Everything counts and makes a difference ■

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***Kate Charters(12), Sarah Charters (13) and Millicent Burggraf (12) were Australian delegates to the 2005 Children's World Summit on the Environment in Japan.***