

# our planet

The magazine of the United Nations Environment Programme — December 2010



DAVID CAMERON  
GETTING BACK ON TRACK

JOSÉ LUIS  
RODRIGUEZ ZAPATERO  
TRANSFORMING ENERGY

PATRICIA  
ESPINOSA CANTELLANO  
CHALLENGE AT CANCUN

TULSI R TANTI  
SOLVING THE ENERGY PUZZLE

## CLEAN TECH

**Low carbon, high growth**





**Our Planet, the magazine of the United Nations Environment Programme (UNEP)**

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A global green new deal is needed to combat climate change and produce sustainable economic growth.



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Concentrated solar power is ready to speed the transition to a brighter and cleaner future.



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A solar city shows that a low carbon lifestyle brings joy and harmony.

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## Green Economy – Developing Countries Success Stories

This collection of eight green economy initiatives from developing countries around the world, illustrates the positive benefits from specific green investments and policies, which if scaled-up and integrated into a comprehensive strategy, could offer a pro-growth, pro-jobs and pro-poor development path. The report underlines that a green economy strategy has established and proven examples on which to build, and that there is a growing interest in seizing opportunities to move to a green economy.

## Blue Harvest – Inland Fisheries as an Ecosystem Service

Published in collaboration with the World Fish Center, this book puts the spotlight on the significant contribution of inland fisheries to diet, health and economies. It draws attention to the fact that the future of these fisheries is intimately linked with the way humanity manages or mismanages its rivers and lakes and their surrounding basins. The book not only underlines the value of freshwater fisheries but provides guidance on how the ecosystem approach can be applied in order to sustain future harvests.

## Global Trends in Sustainable Energy Investment 2010

Published by the Sustainable Energy Finance Initiative (UNEP-SEFI) and Bloomberg New Energy Finance, this year's *Global Trends in Sustainable Energy Investment 2010* report provides an overview of capital flows and an analysis of the trends in sustainable energy investment activity.

## TEEB for Local and Regional Policy Makers

The latest from The Economics of Ecosystems and Biodiversity (TEEB) study, this report is an advisory tool for local and regional policymakers, administrators and managers. It gives practical guidance on how to deal with the challenge of biodiversity loss at local and regional levels. It examines natural resource use and management, what can be done to maintain and support biodiversity, urban and spatial design, as well as market-based approaches, such as payment for ecosystem services (PES).

## Marine Biodiversity Assessment and Outlook: Global Synthesis

Based on scientific data and research across Europe, Africa, North America, Latin America and the Caribbean, West Asia and Asia-Pacific regions, the *Global Synthesis Report* draws on supporting data from all 18 Regional Seas. The series, which was officially launched at the tenth Conference of the Parties to the Convention on Biological Diversity (CBD), is the first systematic assessment of marine biodiversity at a sub-global scale.



## Renewables Global Status Report 2010 Renewable Energy Policy Network for the 21st Century (REN21)

This 2010 edition provides a unique overview of renewable energy worldwide covering both current status and key trends. It is the companion publication to the UNEP/SEFI report *Global Trends in Sustainable Energy Investment 2010*. The joint launch of these publications aims to draw attention to the inextricable link between policy and investment in driving the renewable energy sector forward.

## The Positive Deviant: Sustainability Leadership in a Perverse World Sara Parkin, Earthscan 2010

This book aims to inspire a generation of “positive deviants” — sustainability-literate leaders who do the right thing for sustainability. In addressing the problem that most people in leadership roles lack essential knowledge about sustainability, *The Positive Deviant* offers an opportunity for anyone in or aspiring to a leadership role to get up to speed on essential information very quickly and to design for themselves a journey to sustainability-literate leadership.

## The Clean Tech Revolution Ron Pernick and Clint Wilder, Harper Collins

This book identifies the major forces that have pushed clean tech to its current revolution among the inner circles of corporate boardrooms, on Wall Street trading floors and in Government offices around the globe. It highlights eight major clean-tech sectors — solar, wind, biofuels and biomaterials, green buildings, personal transportation, the smart grid, mobile applications and water filtration — and uncovers how investors, entrepreneurs and individuals can profit from this next wave of technological innovation.



# reflections

ACHIM STEINER

UN Under-Secretary-General and  
Executive Director, UNEP

Twelve months after the high-profile United Nations climate convention meeting in Copenhagen, Governments meet once more in the Mexican city of Cancun to assess and to catalyse a response to the urgent challenge of climate change.

Some have been managing expectations down, but perhaps this is a moment to manage them up. This year has witnessed more than its fair share of extreme weather events — from the tragic floods in Pakistan to the record-breaking temperatures, smogs and peat bog fires in Russia — in line with the latest assessment of the Intergovernmental Panel on Climate Change. Indeed there is every indication that 2010 will join 1998 as the warmest year since records began.

So, the scientific data accumulates. But what about the international response? What will put us on track to limiting greenhouse gas emissions to an average of 44 gigatonnes (Gt) of CO<sub>2</sub>-equivalent in 2020 — the level needed if we are to have a reasonable or 66 per cent chance of keeping global temperatures below 2 °C by 2050?

The pledges made and actions proposed by developed and developing countries at and after Copenhagen must be made good. The funds promised — for fast start and beyond — must be delivered. And the mechanisms needed —

including for reduced emissions from deforestation and forest degradation (REDD) — must be made operational.

UNEP, in partnership with leading climate modelling agencies has published an assessment on where we are and where we need to go. It emerges that the meeting in Copenhagen will have far from failed if all that was promised is delivered. Indeed the ambitions associated with the Copenhagen Accord could cut greenhouse gas emissions by a not insignificant 7 Gt of CO<sub>2</sub>-equivalent, leaving a gap of perhaps 5 Gt in 2020.

There are huge opportunities for bridging that gap, accelerating a response to climate change, and tackling a host of other environmental challenges. Over the past year, the science on so called non-CO<sub>2</sub> pollutants — such as black carbon, methane from sources such as rubbish tips, low-level ozone and nitrogen compounds from vehicles and farming — has become clearer, as has how some of these combine to aggravate their global warming potential.

This suite of pollutants may, it is estimated, be responsible for up to 50 per cent of climate change and — since they are short-lived in the atmosphere — rapid action on them could bring reductions in global warming in days, months or just a few years. Important as this is, it does not preclude the need for aggressive reduction of long-lived gases such as CO<sub>2</sub>, but should be a key complementary measure.

Cutting these short-lived pollutants also has other benefits as they are also responsible for a wide range of other impacts. Black carbon, for example, is a key component of the indoor and outdoor air pollution estimated to kill at least 1.6 million people a year — and damages agricultural productivity. Others also harm health and crops and help cause “dead zones” in the seas. They need curbing anyway, even without climate change. And many, if not all, can be addressed through national and regional health or air pollution agreements — or through forward-looking partnerships such as the new Global Alliance for Clean Cook Stoves.

Yet the window for action is narrowing fast. The next climate convention meeting in South Africa in 2012 may be the opportunity to realize a new twenty-first century treaty. But Cancun also needs to make its own mark in contributing towards a transition to a low carbon, resource-efficient Green Economy, powered by clean technology. It can and it must be a time where action on financing, mitigation and adaptation can mature — perhaps supplemented by action on other greenhouse gases. Above all it must demonstrate to business and to the public alike that Governments remain serious and committed to counter climate change, while seizing the opportunity to meet wider development and environmental goals.



# GETTING BACK ON TRACK

Last year's summit in Copenhagen was a setback for all of us who care about the effects of climate change. But it must not become an excuse to give up the search for a global deal. Climate change is global — and willing or unwilling — we're all in it together. We cannot protect ourselves unless we are also prepared to protect each other.

The reason Copenhagen did not deliver on high expectation was a lack of political will for each country to take the necessary actions, and make the necessary compromises. The responsibility rests with all of us — political leaders in developed and developing



DAVID CAMERON

Prime Minister of  
the United Kingdom of Great Britain  
and Northern Ireland

countries alike. Without commitment and movement on all sides, we will never achieve the progress we are looking for.

The development of the UNFCCC demonstrates the unique role the United Nations, with its convening power, can play. In an area where there had been absolutely zero

global governance, the United Nations has raised international awareness and worked for many years to bring countries together to try and solve the problem. But we have to show in Cancun that the United Nations Framework is capable of getting us back on track towards a global deal. In other words, we have to rebuild trust and find a way to bring the unwilling in; not shut them out.

I think there are three things we can do that will give us the best chance of making progress.

First, we have to make the case for acting on climate change at every



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opportunity. As foreign secretary William Hague said in his recent speech to the United Nations, we have to use the power of diplomacy to put climate change at the heart of foreign policy. We should be great advocates of green growth and the tremendous opportunity of a low carbon market already worth £3.2 trillion and forecast to grow by around 4 per cent a year over the next five years.

At the same time, we have to explain to people the way that climate change is expected to intensify extreme weather events. The water shortages in Africa, the floods in Pakistan and the

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mudslides in China are just a foretaste of what it could bring. The effects of these isolated events are not contained by geography. The drought in Russia this summer, for example, damaged the wheat

harvest, leading to a surge in world prices which hit the poorest hardest and triggered riots in Mozambique. We have to show that acting on climate change, however difficult, is in the interest of all, not just some.

Second, we have to lead by example in our own countries. We cannot ask others to make commitments, especially in the developing world, if we don't take our carbon reduction and renewables targets seriously. In the UK I am determined that my administration should be the greenest Government Britain has ever had, and that we will make a low carbon revolution one of the



© Steve Mann/Shutterstock

defining legacies of the Conservative-Liberal Democrat coalition.

This means a radical step change in cleaning and greening the supply of energy within the UK — with reform of the electricity market and the introduction of a Green Investment Bank to support investment in the low carbon infrastructure Britain needs. It also means ambitious plans for a massive increase in renewable generation capacity, new nuclear build and the development of carbon capture and storage projects. The UK is already the world leader in offshore wind — with more projects installed, in planning and in construction, than any other country in the world. And we are looking at

all the options for facilitating low carbon generation in the future.

Acting at home also means changing how energy is used. Our Green Deal is a revolutionary programme which will give every household in Britain access to home energy efficiency improvements at no upfront cost, cutting household energy bills and making every home energy efficient. And I'm determined my Government will lead by example. That's why in my first week in office I pledged that we would cut 10 per cent from Central Government carbon emissions in the first 12 months of this administration.

Third, we need to identify specific ways in which we can make progress on international action that will rebuild confidence and shift the momentum back towards efforts to reach a global deal. More than 120 countries have now associated themselves with commitments made in the Copenhagen Accord. We must each honour them, and use them as a base on which to build.

So we must develop the framework for reducing emissions from deforestation and forest degradation; strengthen the measurement, reporting and verification arrangements, which will ensure progress on emissions is transparent; and set out the structures for climate finance beyond 2012, including for the commitments in the Copenhagen Accord to establish a Green Fund.

The Secretary-General's Advisory Group on Climate Finance is due to report just before the Cancun meeting, and needs to set out the practical options for a credible path towards the \$100 billion per year the developing world will need in long-term finance by 2020.

*“We need to identify specific ways in which we can make progress on international action that will rebuild confidence and shift the momentum back towards efforts to reach a global deal.”*

We should also bring emissions offers made since Copenhagen into the United Nations process. And where we have some regional influence, we should try to push for even stronger offers. In the UK, for example, we are already pressing for the European Union to move to a 30 per cent target for reducing carbon emissions by 2020 — without waiting for the rest of the world to act.

But we should also ensure the conversation does not just focus on emissions but also encompasses biodiversity and erosion of ecosystems. We must also focus on the huge opportunity of helping developing countries make a direct leap to low carbon — avoiding the high-carbon era that has dominated the developed world — helping to reduce energy costs and improve the standard of living for millions of people.

None of this will deliver for Cancun the success people had hoped that Copenhagen would achieve. But it could just change the momentum and provide the foundation to get back on track in moving towards an inclusive international deal, with developed and developing countries both playing their part. That is the only kind of deal that can turn the ubiquitous threat of climate damage into the universal opportunity of low carbon high growth for all.

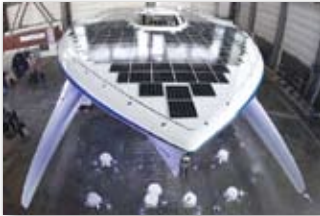


# products



## Too good not to be wood

It looks like wood, feels like wood and handles like wood, yet it contains absolutely no wood. Resysta is a revolutionary eco-friendly decking material designed to protect rainforests by reducing the amount of wood needed for high-quality furniture. It has all the characteristics of tropical hardwood but no wood at all – it is made from rice husks, salt, mineral oil and binding agents. It has none of the downsides of wood: it doesn't crack, splinter, swell or rot and is not vulnerable to insects and the elements. And better still, it's recyclable and no trees are cut down to make it.  
[www.resysta.co.za/](http://www.resysta.co.za/)



## Pollution-free ocean cruising

The world's largest solar-powered boat, the Planet Solar, is about to roll off the slips at its German dock yard. The catamaran is 31 metres long, 15 metres wide and 7.5 metres high. Five-hundred square metres of its hull is covered in photovoltaic solar panels containing some 38,000 solar cells. The boat has a top speed of 15 knots (25 kilometres per hour) and a seating capacity of 50 passengers. The Planet Solar's maiden circumnavigation is planned for 2011.  
[www.planetsolar.org/](http://www.planetsolar.org/)



## Twenty-six hour solar-powered flight

In July this year, the Solar Impulse, an aircraft charged and powered only by the sun, made an historic 26-hour non-stop flight in Switzerland. How can a solar-powered airplane fly at night? The answer is that it spent the first 14 hours of fly time in daylight charging its batteries in readiness for the night time. The wings of this extraordinary aircraft have a span of 63 metres – the same size as an Airbus A340 airliner – and are covered with 12,000 solar cells. This remarkable test flight brings us one step closer to the dream of clean technology air transport.  
[www.solarimpulse.com/](http://www.solarimpulse.com/)



## Solar cell printed on paper

In a world first, scientists at the Eni-MIT Solar Frontiers Research Center have coated paper with a solar cell. With a technique that's similar to an inkjet printer, paper is coated with organic semiconductor material to make a thin-film solar cell. With potential application to plastic, paper and metal foils, the big advantage is that it dramatically lowers the weight of solar cells and the cost of manufacturing them. This technology is still in its infancy and there's a way to go to bring the efficiency up to scratch with standard solar cells. But who knows, this may be a tantalizing glimpse into the future of power generation.  
[http://news.cnet.com/8301-11128\\_3-20004170-54.html#ixzz0yT1X2v9B](http://news.cnet.com/8301-11128_3-20004170-54.html#ixzz0yT1X2v9B)



## Sonic fabric

In the age of MP3 and DVDs, the audio cassette tape has almost become obsolete. However, this old tape has now been given new life in Sonic Fabric, an innovative textile that recycles old cassette tapes. Sonic Fabric is woven from 50 per cent recorded audiocassette tape and 50 per cent polyester thread. It's beautiful, durable and...audible! With a texture and feel of light canvas and a mysterious sheen, Sonic fabric has a wide application for interior and fashion design. Curiously, each batch of fabric has its own sound print. Wearers of Sonic neckties are said to emit good vibes wherever they go!  
[www.sonicfabric.com/faric.html](http://www.sonicfabric.com/faric.html)



## Oil-seeking robot in Gulf of Mexico

Where's Waldo? Waldo is a six-foot-long underwater robot, something like a yellow torpedo, that can detect undersea oil plumes. It was launched off the Florida Keys in July 2010 in an effort to better track the movement of oil plumes and to help protect coastal habitats against possible impacts from the Gulf oil disaster. For one month Waldo and several other robot friends patrolled the seas off the Florida Keys, using sensors to sample the water for oil, and transmitting data to researchers via satellite. Waldo didn't find any oil – fortunately – but did provide the scientists with a good deal of oceanographic data. (Sadly, Waldo was bitten by a shark, but has since been recovered and patched up ready for another mission.)  
[www.nrdc.org/media/](http://www.nrdc.org/media/)



© Peter Ginter/Corbis

# Transforming energy



JOSÉ LUIS  
RODRIGUEZ ZAPATERO  
.....  
Prime Minister of Spain

Climate change is a global threat, with disastrous consequences for the well-being of all if the average global temperature rises more than 2° Celsius above pre-industrial levels.

The causes of this threat are well known. More than three quarters of greenhouse gas emissions, which cause climate change, stem from energy consumption. A gradual change in the energy model is therefore needed. The question remains whether we currently have sufficient means for achieving this.

With current existing technologies we are in a position to affirm that a shift to a sustainable form of energy production is possible. At its thirteenth session in Bali in December 2007, the Conference of the Parties to the United Nations Framework Convention on

Climate Change identified climate-friendly technologies as the pillars to build upon for future development.

Through the use of less carbon-intensive energy sources and greater energy efficiency it is possible to reach an optimum level in reducing emissions. This change in the energy model requires new investments in infrastructure, in both developing and developed countries, as well as increased cooperation and reinforced policies that promote energy security. All these aspects require adequate financial support.

We must not allow the economic crisis to slow down this change. Rather, the crisis must spur the development of a new economic model for the twenty-first century. A historic opportunity exists to move towards a stable and sustainable model for growth. The time is ripe for what we have come to call a Global Green New Deal.

The European Union plays a key role in the global commitment to combat climate change, which simultaneously tackles the economic crisis. It has, to date, spearheaded global leadership in this area by acting responsibly and urging other countries to accept new ways of facing the problem.

During the Spanish presidency of the European Union, and in order to continue this leadership, member States agreed on the new Europe 2020 Strategy, aimed at achieving a sustainable economic model. By correctly implementing our policies, we will be able to transform our energy mix and reduce our energy import bill by 60 billion euros by 2020, and 150 billion by 2030. In so doing, we will not only reduce emissions, but generate employment and stimulate

economic activity. These prospects speak for themselves: it is foreseen that the European Union's 2020 renewable energy target will create an estimated 2.8 million jobs in that sector.

Within the European Union, Spain has been committed to renewable energies for more than 40 years. We have recently strengthened our commitment because we believe they are an essential component of our future. With this aim, Spain was the driving force in establishing the International Renewable Energy Agency (IRENA), and, as a country, we have invested heavily in research, development and innovation, particularly in technologies such as wind power, photovoltaic energy and thermoelectric solar energy.

This has enabled the rapid development of a flourishing industry built on technological innovation and using the clean domestically produced energy resources that Spain has in abundance. The process of incorporating renewable energies into Spain's power generation has set a benchmark for the rest of the world, as was recognized in a recent IRENA report.

The key to our success in integrating these energy sources has undoubtedly been our economic and legal framework, based on a system of bonuses and regulated tariffs which has been in force for 30 years. This stable framework is nevertheless continually being improved and adapted to suit current levels of technological development.

At the end of 2009, renewable energies covered some 11 per cent of our final energy needs. Estimates for 2020 suggest that we could surpass the objective of 20 per cent

*“Through  
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of gross final energy consumption defined by the Renewable Energies Board for Spain.

The country's renewable energy sector now consists of more than 4,000 businesses — some internationally recognized for their own technological development capacity — and direct or indirect employment for more than 200,000 people.

*In conclusion:*

The troubling scale and effects of global warming demand a reduction of greenhouse gas emissions, which is possible only through the increased use of new clean technologies.

The commitment to renewable energy is both environmentally and economically sound.

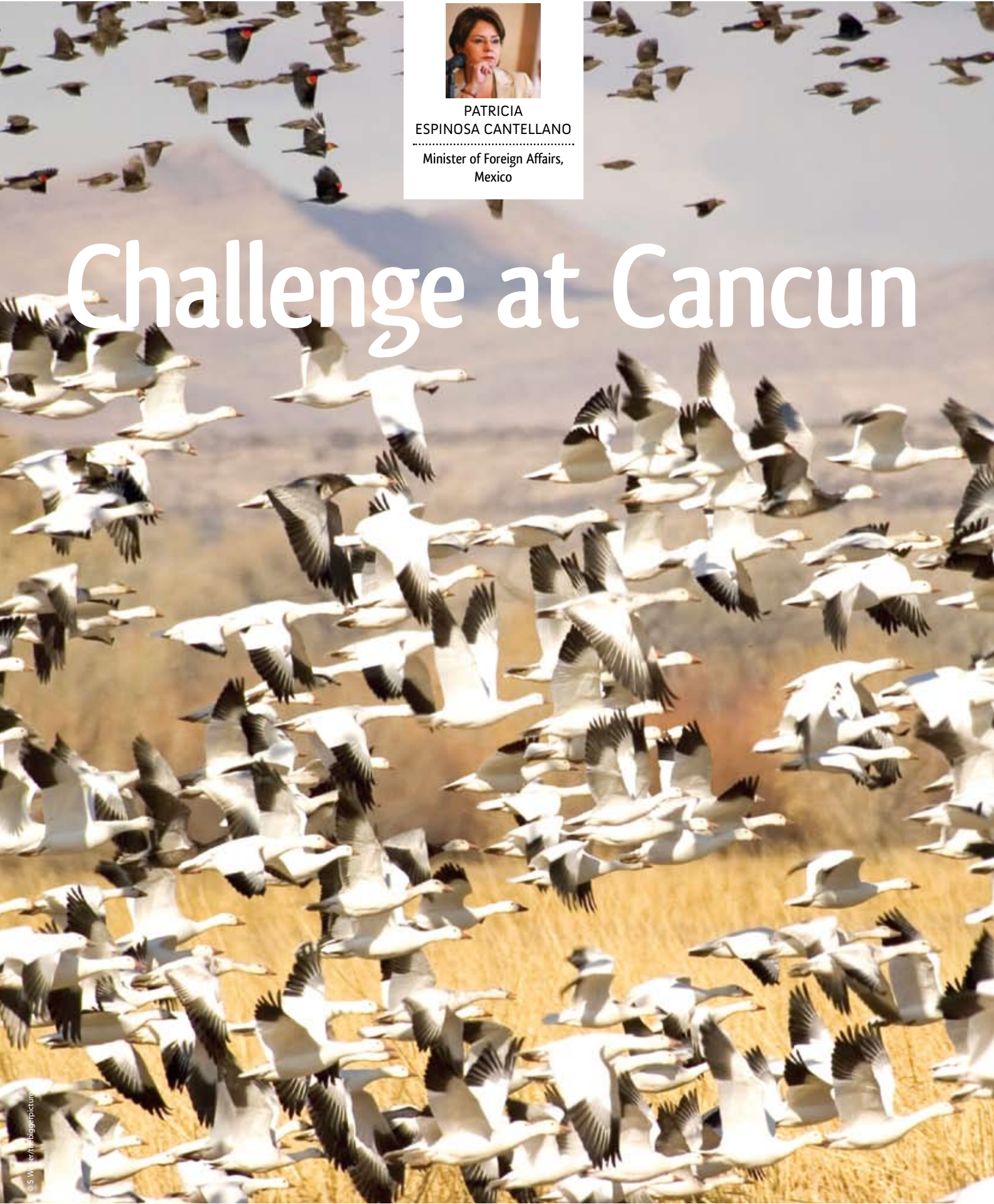
The future will depend to a large extent on the actions and policies that we decide on now.

We must all be involved in efforts to combat climate change.



PATRICIA  
ESPINOSA CANTELLANO  
Minister of Foreign Affairs,  
Mexico

# Challenge at Cancun



© S. Wierzbicki/Bigpicture



*“Those that  
adapt the best  
to the demands of  
a low carbon world  
will*

*be best placed  
to take advantage of  
the new opportunities  
in a cleaner and most  
sustainable future.”*

Climate change is one of the defining issues of our time. No State can be immune to its impacts, and no State alone can solve the problem. We must act globally. The atmosphere is our global commons and we should be able to overcome old debates and provide concrete and substantial actions, according to our respective responsibilities and capabilities.

In an increasingly small and interlinked world, everyone's fate is bound together. The recent economic crisis has been a strong reminder of this. Dealing with climate change goes to the very heart of development strategies and to the way our economies are run. We should not delay the necessary decisions. Action is essential if we are to succeed in building more equitable and fairer societies, and in alleviating poverty.

In Mexico, we estimate that 15 per cent of our national territory, over 68 per cent of our population and more than 70 per cent of our GDP is highly exposed to the impacts of climate change. In 2005 we suffered the worst hurricane season ever, with economic costs that reached 0.6 per cent of our GDP. In 2009

we had a serious drought, and in 2010 an unprecedented rainy season has produced the worst flooding in our recent history.

The good news is that climate change is also an opportunity for

revisiting our individual carbon footprint, reorienting investments for clean, efficient and renewable technologies in all sectors, and enhancing international cooperation towards a low carbon global economy. Those that adapt the best to the demands of a low carbon world will be best placed to take advantage of the new opportunities in a cleaner and most sustainable future. International support must go to societies that need it the most.

Mexico is willing to act. All sectors of Mexican Government and society are coordinating on mitigation and adaptation policies and measures, which are largely set out in our Special Climate Change Program. Through this Program, Mexico aims to achieve unilateral emissions reduction objectives of 51 million tons of CO<sub>2</sub>-equivalent by 2012, and up to 30 per cent of our emissions from a business-as-usual scenario by 2020 with the support of external financing.

With regard to clean energies, by 2012 over one quarter of our electricity will come from renewable sources, including solar and wind power generation. Mexico has also established programmes to replace traditional energy light bulbs with efficient ones and is offering subsidies to help households replace old refrigerators with far more efficient ones.

Nevertheless, national efforts such as ours are only a part of the international puzzle in which every nation must contribute to an effective, global and fair response to climate change. We must reach agreements on the outstanding central issues in the negotiations, demonstrating the capacity of the United Nations system to address global challenges through effective consensus-building mechanisms.

Cancun, Mexico, is host to the sixteenth Conference of the Parties (COP 16) to the United Nations Framework Convention on Climate Change and the sixth Meeting of the Parties (CMP 6) to the Kyoto Protocol. As incoming President of the Conferences, Mexico is working hard in order to advance negotiations in an inclusive and transparent way. We have placed a high priority on rebuilding confidence among the parties and on the process itself.

In Cancun we could agree upon a concrete package of decisions that strengthens implementation of the climate regime, ensuring the continuity of its basic principles. We must show our political will and start a new era of delivering global action, based on what science tells us is required.

Developed countries must demonstrate clear leadership with ambitious emission reduction commitments in the mid and long term. According to UNEP data, the current pledged reductions



*“According to UNEP data, the current pledged reductions by Annex-I countries add up to 11-16 per cent cuts on 1990 levels by 2020. This is well below the 25-40 per cent range recommended by the Intergovernmental Panel on Climate Change.”*

by Annex-I countries add up to 11-16 per cent cuts on 1990 levels by 2020. This is well below the 25-40 per cent range recommended by the Intergovernmental Panel on Climate Change.

The global nature of climate change requires a sense of shared responsibility. Developing countries should also agree on enhanced and appropriate mitigation actions, in conformity with our common but differentiated responsibilities and capabilities.

As a developing country, Mexico knows first-hand that financing is key to increasing serious climate change actions. The current financial system for climate change is limited in scope and has an inadequate structure of governance. A solid agreement on finance is paramount to allow solid progress in other areas of the Bali Action Plan.

We must facilitate developing countries' access to financial support for mitigation and adaptation policies and projects, recognizing the importance of reducing emissions from deforestation and forest degradation, as well as establishing a dynamic framework for technology

development and transfer. Action on adaptation must allow developing countries to enhance their resilience to adverse impacts.

The regime will necessarily require transparency provided by streamlined and clear procedures. Whether through measuring, reporting and verifying mitigation and finance actions by developed countries, or by an international consultation and analysis mechanism for developing countries, we can all agree on the importance of building confidence and following-up on the efforts undertaken.

Time is running out. In order to achieve significant progress in Cancun, all countries must increase their levels of ambition. It is in each of our nations' best interest to do so.

We can and must succeed in moving to a low emission future while ensuring there are sufficient supplies of energy and economic growth to meet the needs of our populations. The conferences in Cancun provide a unique opportunity to reverse a dangerous trend. The international community must not fail to produce concrete and credible results.

# awards and events

## UNEP GOVERNING COUNCIL

The twenty-sixth session of the UNEP Governing Council will be held over four days, from 21 to 24 February 2011, including ministerial consultations from 21 to 23 February. The ministerial dialogue will be held in the context of UNEP's contribution to the preparatory process for Rio+20, with a particular focus on the green economy and international environmental governance. The meeting will also consider and approve the UNEP biennial budget and programme of work for 2012-2013, and discuss other issues including the state of the environment and chemicals management.



[www.unep.org](http://www.unep.org)

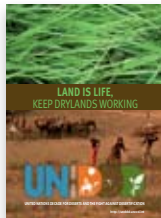
## ST. ANDREWS PRIZE FOR THE ENVIRONMENT

An innovative method of removing arsenic from groundwater without using chemicals has won this year's St. Andrews Prize for the Environment. A team from Queen's University, Belfast, addressed the alarming levels of arsenic contamination of water in West Bengal and established operations in six rural areas which now supply clean and arsenic-free water to the local populations. The St. Andrews Prize is an environmental initiative of the University of St. Andrews, Scotland, and ConocoPhillips, an integrated energy company. The prize is awarded for original and innovative environmental ideas that are realistic and realizable and that take account of social and economic implications.

[www.thestandrowsprize.com/](http://www.thestandrowsprize.com/)



## DECADE FOR DESERTS AND THE FIGHT AGAINST DESERTIFICATION



<http://unddd.unccd.int>

In August 2010 the United Nations launched the Decade for Deserts and the Fight against Desertification, an initiative aimed at raising awareness and action to improve the protection and management of the world's drylands. Drylands are home to one third of the world's population and they face serious economic and environmental threats. Running through to December 2020, the Decade is the opportunity to make critical changes to secure the long-term ability of drylands to provide for humanity's well-being.

<http://unddd.unccd.int/purpose.htm>

## CLIMATE CHANGE CONFERENCE IN CANCUN



From 29 November to 10 December 2010, Cancun, Mexico, will host the sixteenth Conference of the Parties (COP 16) for the United Nations Framework Convention on Climate Change. The climate change conference will also serve as the sixth COP for Parties to the Kyoto Protocol (CMP). Representatives from 193 countries will come together to build on the Copenhagen Accord from COP 15 in 2009, and work out a global, fair and equitable agreement to address climate change.



<http://unfccc.int/>

## INTERNATIONAL CHILDREN'S PAINTING COMPETITION

Fourteen-year-old Coco Tin Chi Ting from Hong Kong is the winner of UNEP's nineteenth International Children's Painting Competition on the Environment. Hundreds of thousands of children from across the world entered the competition which was themed "Biodiversity: Connecting with Nature". Coco said her winning painting was a warning about pollution and its effect on animals. She received \$2,000 in prize money and an all-expenses-paid trip to collect her prize at the Tunza International Children's Conference in Nagoya, Japan, in October.



<http://unep.org/tunza/children/>

## THE ZERO EMISSIONS RACE



Four state-of-the-art electric vehicles set off from the United Nations Palais des Nations in Geneva in August on the longest and greenest race of all time. Teams from Australia, Germany, South Korea and Switzerland are driving hi-tech electric vehicles especially developed for the 30,000-kilometre zero emissions around-the-world race that ends in Geneva in January 2011. The brainchild of Louis Palmer, the first person to drive a solar-powered car around the world, the Zero Race aims to bring attention to renewable energy and clean technology.



[www.zero-race.com/](http://www.zero-race.com/)

# Catching the wind of change



CHRISTIANA FIGUERES

Executive Secretary of  
the United Nations Framework Convention  
on Climate Change (UNFCCC)

High-level political will to tackle climate change as the defining challenge of our time emerged last year and a powerful wind is still blowing from societies, science and business to meet the climate challenge. Governments must now set full sail to capture that wind of change.

Indeed they can set those sails higher in Cancun. They can capture the pledges they have already made and begin to implement them. What is agreed — it can be fully appreciated — may not be at the level that science demands. But this is the next essential step in the right direction. Indeed, Governments have the opportunity and responsibility to build on past efforts in five key areas.

Firstly, they need to resolve what to do with their public pledges on emissions. All industrialized countries have pledged to cut them by 2020, while all major developing countries have submitted plans to limit their emissions growth.

A key question for Governments is how these pledges can be captured and entered in a binding way into an international agreement. But even if all current pledges were met on time, the response would remain inadequate in the longer term if the world is to keep within safer global temperature rises. So, more-stringent actions to reduce emissions cannot be much longer postponed. And industrialized nations must lead in taking them.



International agreements that incorporate effective mechanisms to speed up and scale up action between economies can undoubtedly help individual countries to raise their efforts to cut emissions. If they are to make progress, Governments also need to have a serious conversation about the Kyoto Protocol — the only existing international agreement with legal status to verify emission reductions — not least for the sake of clarity on the future of the carbon market.

Secondly, Governments seem to be on track to agree to a comprehensive set of ways and means that allow developing countries to take concrete climate action. These include adapting to climate change, limiting the growth of emissions, getting adequate finance, boosting the use of technology, promoting sustainable forestry and building up the skills and capacity to do all this. All developing countries require help to take these actions, but the poorest and most vulnerable among them need it most urgently.

Thirdly, industrialized nations can turn their pledges of funding into reality. Last year, they promised \$30 billion in fast-track financing for developing country efforts on adaptation and mitigation through 2012. Developing nations see the transparent and real allocation of this money as a critical signal that industrialized nations are committed to progress in the broader negotiations. Industrialised countries also pledged to find ways and means to raise \$100 billion per year by 2020.

Fourthly, countries want to see that what they agree with each other is measured, reported and verified in a transparent and accountable way. The concept of “MRV”, as it



*“International agreements that incorporate effective mechanisms to speed up and scale up action between economies can undoubtedly help individual countries to raise their efforts to cut emissions.”*

is called in the negotiations, is not complex: countries simply want to know that what they see is what they get. Progress here will be a gauge of whether countries are moving to common ground.

Finally, while Governments agree that pledges need to be captured in a binding manner, they still need to work out how to do it. Binding agreements among Governments can be on an international or national level, can be based on compliance with rules and regulations, or can involve a mix of these elements. Governments are currently considering them all.

Combining the last two elements — accountability and binding action — is essential if societies, science and business are to be confident that clean, green strategies are being pursued and will be rewarded globally, as well as locally.

Governments face no small challenge. What is at stake is the long-term, sustainable future of humanity. We know the milestones science has set — by when and by how much emissions must drop to have a chance of avoiding the worst. They require nothing less than an energy revolution both in production and consumption.

Governments have been building common ground since the UNFCCC began in Rio in 1992, and then at major gatherings in Berlin, Kyoto, Marrakesh, Bali, Copenhagen and now Cancun. The idea that a single magic, global agreement could solve all climate issues does not do justice to the crucial steps already achieved — and, most importantly, it dangerously ignores the need to keep innovating. In Cancun, Governments can harness the politically possible to achieve concrete and unmistakable progress.

# UNEP at work

UNEP undertakes a wide range of activities in promoting and facilitating the development and uptake of clean technology. Here are a couple of recent examples. For further examples of UNEP's climate change work visit [www.unep.org/unite/30Ways](http://www.unep.org/unite/30Ways)



## THE PROBLEM:

Against a background of diminishing hydropower resources, unstable oil prices and dwindling biomass, Kenya is eager to make more use of its massive geothermal energy potential. But high upfront costs and the substantial risks involved in geothermal development have meant only a fraction of Kenya's potential has been exploited.

## THE SOLUTION:

Improved geophysical imaging and interpretation of geophysical data has lowered geothermal development costs by reducing the number of expensive, unproductive wells. Such improvements at the National Power Generation Utility of Kenya's (KenGen) Olkaria facility in the Rift Valley, have made it easier to identify wells of high generation potential, increased power generation and supply reliability while simultaneously reducing costs and benefitting the environment.

## WHAT UNEP DID:

In 2002 UNEP began working with KenGen on the Joint Geophysical Imaging (JGI) for Geothermal Reservoir Assessment project. Since then the project has improved geophysical data interpretation techniques and provided state-of-the-art equipment for exploration to identify promising new drilling sites. The project has resulted in substantial savings on geothermal development, reduced CO<sub>2</sub> emissions and helped technology transfer and capacity building.

## THE BIG PICTURE:

The project has already shown its regional potential, with KenGen using its expertise to help Rwanda, Eritrea and Zambia assess and develop their geothermal resources. UNEP and the World Bank have initiated a regional project in six East African countries — Djibouti, Eritrea, Ethiopia, Kenya, Tanzania and Uganda — to tap into the Rift Valley's vast, unexplored geothermal potential.



# Solar Loans for rural homes

## THE PROBLEM:

More than 60 per cent of Indian households have no access to reliable electricity supplies and depend on kerosene for light and on burning dung and wood for heat. Millions of poor people face respiratory diseases that result from burning solid fuel. Lack of electricity is also a powerful barrier to economic and social development.

## WHAT UNEP DID:

UNEP and the UNEP-Risoe Centre worked with Canara and Syndicate banks and their rural Grameen affiliate banks in the southern Indian states of Karnataka and Kerala, helping the rural poor gain access to clean and affordable energy supplies.

## THE SOLUTION:

In 2003 UNEP's Indian Solar Loan Programme teamed up with two of India's largest banking groups to establish the lending market for household solar lighting systems. The programme provided technical support and training, as well as an interest rate subsidy that allowed banks to reduce the cost of loans, accelerating market penetration of solar lights in Southern India. The new lending market financed almost 20,000 solar home systems between 2004 and 2007.

## THE BIG PICTURE:

The Indian Solar Loan Programme has influenced national policy, with the Government of India sidelining its capital subsidy approach to supporting solar power in favour of interest subsidies. Costs of \$900,000 in interest subsidies generated \$6.7 million in commercial financing, and have been more than offset by household savings on kerosene and other traditional energy sources.



TULSI R. TANTI

Chairman and Managing Director, Suzlon Energy

# Solving the energy puzzle

I am a traveller — not by profession but, rather, for my profession. My business has taken me around the world many times. My travels have given me the opportunity to witness the modern world's glory and also to come face-to-face with some of its disappointments. In this world of contrasts, many basic human needs have been left unfulfilled — food, water and energy.

At first glance, all three challenges seem unconnected. But are they? To me, they all seem to be the consequence of one basic fundamental mistake.

We face food shortages because we have eroded irrigation land, burned down forests and created an imbalance in the very source — nature. Our industrialization is based on rich intensity, but highly polluting energy sources contributing to climate change, which in turn has led to extreme cases of droughts and floods — the reason for water shortage. Lastly, we are heavily dependent on depleting sources of non-renewable energy, ignoring the vast renewable natural resources.

The common thread running through all our challenges stems from our approach — or rather the lack of it — towards nature. The connection runs deeper. Today, brilliant minds from across the world have figured out solutions to meet our food and energy requirements — better irrigation methods, desalination processes, and the like — but all of these improvements are energy intensive. So, if we can solve the energy puzzle, we open up several more opportunities to meeting our food and water requirements.

A puzzle is defined as a mass of irregular pieces, which when fitted together form a complete picture. Now, look at the world map — doesn't the definition fit? Irregular shaped countries and continents, with inequitable distribution of resources, in different stages of growth — all fitting together to form one complete picture. It is obvious then, that a problem which plagues the whole world needs a solution that is applicable to the whole world.

The root of the energy puzzle is simple — we need a lot more energy than we are producing; the developed countries need to sustain their growth, the developing countries to power their own growth and progress. The challenge is to meet energy requirements in a fashion that is both responsible and sustainable; a task made more difficult due to issues of energy security and climate change. But, at the heart of every challenge is an opportunity. The opportunity here is to make most of the natural and abundant resources with which the world is blessed; closing the energy gap with power generated from renewable resources, which are clean, green and plentiful.

The average global power consumption currently stands at 15 terawatts (TW), and the global wind power potential alone is 72 TW. A single average-sized wind turbine can prevent the emission of 1,500 tons of CO<sub>2</sub> each year. Renewable sources are not only part of the solution to our depleting fossil fuels, they are the also the way towards a healthier planet.

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Recognizing the solution, though arguably the biggest step, is to win only half the battle. The components that are popularly believed to be up against each other — different energy segments, countries and even divisions among Governments, industry and academia — are all, in reality, crucial pieces of the puzzle. All have to work together to provide a level and transparent playing field, where no borders exist and everyone is aiming to reach one objective.

This is not easy, but at least we benefit from knowing how the completed puzzle would look. Global leaders would keep differences aside and focus on creating global solutions. The world would have a truly diversified energy portfolio, in which the mix assures energy security and minimizes the environmental threat. The best of the developed world’s technique and expertise would be used to develop new “green” markets with the least resistance. Governments, the private sector and the regulators would realize that they all seek a common goal — to serve the world’s people — so they would encourage and collaborate with each other.



© Image Source/Corbis

It is agreed that the past attempts at an agreement legally binding on all nations have faced more than one roadblock, but none of them were without a positive outcome. COP15 brought together 120 heads of State and Government, 114 of them voluntarily signing the Copenhagen Accord. Since the conference, the number has gone up to 139 countries — a clear indication that each nation wants to seek the path towards a greener tomorrow. The climate summit may not have achieved its targeted outcome, but it did certainly bring us a step closer to it.

So COP16 in Cancun should be a platform to gain knowledge on what worked and what did not. Governments around the world

have applied very successful policies and mandates such as renewable standards, feed-in tariffs, renewable energy certificates, cap and trade, and unique initiatives like wind auctions. The private sector has contributed immensely, resulting in improved production processes and cutting-edge technological advances. They have set the lead, and clearly shown that the path towards a greener tomorrow, though difficult, is not impossible.

I believe that sharing knowledge is invaluable to solving the energy puzzle. The next step is to take solutions that have worked locally on to the global stage, so that the picture is complete. Let the dialogue begin, I believe we can — and shall — solve this puzzle if we really want to. I certainly do.



JONATHON COUNSELL

Head of Environment,  
British Airways

# Flying clean away

For the first time, global Governments have a common stance on international aviation and climate change. Though it went largely unreported at the time, the world's aviation ministers meeting this autumn at the International Civil Aviation Organisation (ICAO), the industry's global governing body, agreed a position to be presented to the Cancun climate summit. This represents an important milestone toward establishing a policy that will enable aviation to make a clear, accountable and proper contribution to global emissions reduction.

International aviation does not fit neat geographical boundaries, so it is very difficult to manage the industry's CO<sub>2</sub> emissions (about 2 per cent of the global human-made total) under the United Nations traditional country-by-country framework. The global governmental agreement overcomes this issue by treating world aviation as one sector rather than the sum of more than 190 national parts.

It also sets important targets for controlling and reducing the carbon impact of this global sector. These include fuel efficiency improvements of 2 per cent per year

up to 2050 with the aspiration of achieving carbon neutral growth from 2020. (In Europe, we will achieve this from 2012.) The longer-term fundamental target, which the global aviation industry has adopted, and is now looking for Governments to approve too, is a 50 per cent reduction in net emissions by 2050.

Aviation ministers would not have supported these targets if they did not believe they were achievable. At British Airways, we set ourselves the 50 per cent reduction target two years ago — and we are very confident it can be realised through

a combination of measures, including alternative fuels, cleaner aircraft, operational efficiencies and carbon trading. Everyone in the company is acutely aware of the impact airlines have on the environment and is absolutely determined that the industry should play its full part in the global effort to combat climate change.

Advancing biofuel technologies has great potential. British Airways is at the forefront of developing them and is working to ensure that any new fuels are wholly sustainable. This means that biofuel crops, as well as reducing our carbon emissions, must not take land from agricultural use, threaten biodiversity and natural habitats, or result in deforestation.

With our United States partner Solena, we are planning to build Europe's first biojet plant in East London. When production starts in 2014, the plant will convert 500,000 tons of waste a year into clean fuel in sufficient quantities to power our fleet at London City Airport twice over. And, in reducing levels of waste going to landfill, this will also cut emissions of the greenhouse gas, methane.

We are also supporting a project at Cranfield University examining the potential of fuel based on algae grown at sea, which could capture CO<sub>2</sub> from both the atmosphere and ocean.

New aircraft will also play a significant role. Our newest longhaul aircraft type, the Boeing 777-300ER, provides a 15 per cent saving in CO<sub>2</sub> per seat. And the Boeing 787 "Dreamliner", — of which we begin taking delivery in 2012, will bring further improvements, generating



*“The longer-term fundamental target, which the global aviation industry has adopted, and is now looking for Governments to approve too, is a 50 per cent reduction in net emissions by 2050.”*

30 per cent less carbon per seat than the 747s they will replace.

Operationally, we look to reduce emissions wherever we can. Wherever possible, our aircraft taxi in on one engine, use fuel-saving continuous descent approaches and shut down auxiliary power units during turnarounds. We have also taken a series of measures to reduce onboard weight.

We recently linked up with air traffic control providers NATS and BAA to operate a “perfect flight” from Heathrow to Edinburgh so as to highlight the potential for greater operational

efficiencies. Protected from delays on the ground, the flight made a continuous climb to its most fuel-efficient cruising altitude, then received the most direct routing and an uninterrupted descent into the Scottish capital. This saved 350 kg of fuel — a 12 per cent improvement on a normal flight. By making routings more efficient across the board, initiatives such as the Single European Sky could achieve this level of CO<sub>2</sub> saving on a much wider basis.

So there are many direct ways in which aviation can reduce its emissions. The industry's carbon impact can be further reduced through emissions trading — which is due to begin for European Union airlines in a little over a year's time.

Emissions for each airline will be capped. Airlines will have to remain within the cap by cutting their emissions or buying additional carbon allowances from companies that have not used up their allocations. Such purchases are likely to be expensive — and, unlike aviation taxes, will give airlines a strong incentive to take further action to cut their direct carbon output.

Of course, a scheme limited to the European Union can only have a partial impact on global aviation emissions — and in some ways may unwittingly trigger emissions growth outside Europe.

The solution is a global framework for carbon trading. That is what we want to see — and the ICAO decision has taken an important step towards it. Policymakers at Cancun should now seek to promote measures that can enable a global framework to become a reality. That is the right way forward, and it cannot come too soon.

# people

## MAJORA CARTER

The founder of a non-profit environmental activist organization, Sustainable South Bronx (SSBx), in one of New York City's poorer areas, Majora Carter has become one of the city's best-known advocates for environmental justice. Soon after its establishment the SSBx was engaged in a battle over New York City's plan for a large solid waste management plant on the local waterfront. Having successfully diverted these plans, Carter and the SSBx went on to other projects including building a highly successful urban green-collar job training and placement system, developing a green-roofing business to reduce cooling costs and conserve water, and creating the South Bronx Greenway, a \$330 million, 10-mile cycling-and-walking path linking eight acres of parkland. Carter is a former winner of the MacArthur Foundation award.

## SABA DOUGLAS-HAMILTON

Born in the Great Rift Valley, Kenya, Saba Douglas-Hamilton was introduced to her first wild animal when just six weeks old. It was an elephant being studied by her zoologist father, Dr. Iain Douglas-Hamilton, in Tanzania. After earning a first class degree in social anthropology, her first job was with Save the Rhino Trust in Namibia's Skeleton Coast. Later, Douglas-Hamilton joined her father's charity, Save the Elephants, as its chief executive officer to establish a research centre in Samburu National Reserve in Northern Kenya. Here she was "talent-spotted" by the BBC Natural History Unit and her life as a wildlife filmmaker began. Best known for following leopards in the popular series Big Cat Diary, she has filmed wildlife all over the world. In 2009 she was one of the faces fronting UNEP's Seal the Deal campaign.



## HAROLD A. MOONEY

Among many other outstanding and prolific contributions to environmental science, Harold A. Mooney, has championed the idea that biodiversity is central to ecosystem functioning. His work has been influential in shifting the perspective from a species-centered approach to one based on ecosystems and the services they provide to humanity. A Professor at Stanford University, Mooney's achievements include being the co-chair of the scientific panel of the Millennium Ecosystem Assessment, a deep involvement in the recently fruitful efforts to establish the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, editing some 25 books, and the enviable record of having had his research cited in over 12,000 scientific papers since 1988. In this, the 2010 International Year of Biodiversity it is very fitting that Professor Mooney won the Volvo Environmental Prize.

## MICHELLE BACHELET

On 14 September 2010, Michelle Bachelet was named Under-Secretary-General for the new "superagency", UN Women, the United Nations entity for gender equality and the empowerment of women. Ms. Bachelet is a pediatrician and epidemiologist, and a popular former President of Chile. She has already commenced work in her new post, and the agency will be launched in 2011. UN Women will incorporate the four existing United Nations gender agencies, the Division for the Advancement of Women (DAW), the International Research and Training Institute for the Advancement of Women (INSTRAW), the Office of the Special Adviser on Gender Issues and Advancement of Women (OSAGI) and the United Nations Development Fund for Women (UNIFEM).



## DAVID DE ROTHSCHILD

Sailing across the Pacific Ocean on a sail boat made from 12,000 re-used plastic drink bottles held together with glue made from cashew nuts sounds like a seriously audacious mission. But that's exactly what David de Rothschild has done to spread his seriously important environmental message. De Rothschild, leader and founder of Adventure Ecology, and the crew of the *Plastiki*, undertook their fully sustainable expedition to alert the world to the shocking and unnecessary effects of single-use plastics on the health of our oceans and its inhabitants. It's estimated that annually, 1 million seabirds and 100,000 marine mammals and sea turtles die when they become entangled in or ingest plastic pollution. *Plastiki* is an intriguing environmental "message in a bottle" to raise awareness, beat waste and throw a spotlight on solutions.

## THULI BRILLIANCE MAKAMA

Thanks largely to the efforts of Thuli Brilliance Makama, a landmark court ruling in Swaziland has given hope to disenfranchised local communities neighbouring privately owned game reserves. In the name of conservation, local people have been increasingly forced off of their traditional lands and persecuted for continuing the hunting and gathering practices necessary for their survival. A 2002 amendment to the Swaziland Environment Authority Act, designed to give local communities a say in environmental management decisions was ignored by the then Minister of Environment. NGOs were effectively excluded from filling their allotted position on the Management Board of the Swaziland Environment Authority. Makama challenged the Minister's actions in Swaziland's High Court. In 2009 the Court ruled that that environmental groups will now have a place on the Management Board. For her efforts, Makama was awarded a 2010 Goldman Environment Prize.



## MARINA SILVA

Marina Silva has been a tireless fighter for the protection of the Amazon rainforest. She has championed conservation while taking into account the perspectives of people who use forest resources in their daily lives. As a member of Brazil's senate, she successfully legislated for rainforest preservation, defended her people against poverty and protected their way of life. As a former Minister of the Environment she made a remarkable contribution to preserving the biologically rich Brazilian Amazon. A substantial decrease in deforestation in recent years is undoubtedly linked to a new Government process implemented by her and fundamentally based on the idea of a cross-cutting approach to environmental issues. In addition to being a UNEP Champion of the Earth, Silva is the recipient of the Goldman Environmental Prize and the Sophie Prize for the environment.

## SIR RICHARD BRANSON

Critics accuse him of self-interest and a conflict of interest, but whatever your take, Sir Richard Branson has an undeniable ability to keep climate change solutions in the headlines. In 2006, the British billionaire pledged \$3 billion for the development of clean fuels and renewable energy. In 2007, he offered a staggering \$25 million prize for anyone who could come up with a system for removing greenhouse gases from the atmosphere. The following year, his airline company Virgin Atlantic flew a demonstration flight with a 747 jumbo jet whose fuel contained a small percentage of biofuel. He's also one of the generals in the Carbon War Room, a high-profile group whose aim is to harness the power of entrepreneurs to implement market-driven solutions to climate change.



# SEIZE THE MOMENT



JIGAR SHAH  
.....  
CEO, The Carbon War Room

Investors and policymakers face a historic choice: invest in energy infrastructure now or wait for economic recovery. The world undoubtedly faces serious challenges to both capital markets and the global economy as the effects of the financial crisis unfold, but this is not an “either/or” issue. Green investment is not a luxury that we cannot afford, as some commentators contend. Rather, investing in green energy infrastructure is a business and environmental necessity that we cannot afford to postpone.



*“Green investment is not a luxury that we cannot afford... it is a business and environmental necessity that we cannot afford to postpone.”*



The cost of clean energy technologies is decreasing steadily, and China and the European Union continue to adopt supportive policies. Yet the United States remains unconvinced that green infrastructure is a viable, smart investment. Since the nineteenth century, we have looked to Wall Street for its innovation and mettle in finding the necessary capital to grow and strengthen United States infrastructure, and today is no different. We need to identify its motivating factors for — and facilitate its investment in — climate change solutions to help unlock capital for one of the greatest wealth-creation opportunities of our lifetime.

There must be a shift away from investment in business-as-usual resources toward next-generation energy systems that combines substantially less emissions with higher job creation. There are varying views regarding the amount of investment needed to transition to a low carbon economy, but the World Economic Forum and

Bloomberg New Energy Finance estimate that it will require a shift of approximately \$550 billion per year for 20 years — less than 1 per cent of total current private capital allocations.

We must determine what it will take for pension funds, high-net-worth individuals, sovereign funds and retail money holders to shift their equity to lower risk, clean climate solutions, and what those new financial products will look like. We must also begin to work with capital sources and entrepreneurs to scale up existing solutions that work within existing policy frameworks.

Specifically, we must focus on four key priorities that will keep us on a path toward meaningful carbon reduction.

First, we need to focus on the co-benefits of clean tech solutions. By pushing for a comprehensive negotiation on carbon dioxide and its equivalents, we have deliberately shifted the conversation away from

clean air, clean water, reduced health impacts, lower bills, good jobs and economic development — the things people actually care about. Refocusing on the good work already being done in this space will encourage more support without the rancour surrounding greenhouse gas emissions.

Second, new financial products must be created. We can shift the required \$550 billion per year in private capital allocations by investing in profitable returns. Although we have invested heavily in educating the finance sector, the investment banking community has still not created the necessary suite of financial products. With more than 85 per cent of the investment capital in private hands, entrepreneurs must now step in to bridge this gap.

Third, it is time to pursue incremental policy victories by focusing on opportunistic moments. Every day, events occur that present real opportunities for small wins





that can have a huge impact: an oil spill in the Gulf of Mexico, a new coal plant applying for a water permit, a new building undergoing construction, a new leader emerging in Nigeria, the development of an economic development plan in Ghana, or the conception of a new transportation plan. To date, however, these moments have not been leveraged effectively.

Finally, we must account for the “true costs” associated with the current economy. Our inability to transition away from a carbon-intensive economy is driven by our misguided measurement of national and international wealth and progress. The billions of dollars in explicit subsidies (such as to fossil fuels) are accounted for, but implicit costs borne elsewhere (such as health care costs from pollution) are not included in the calculation of expenses. Ending information asymmetries so as to address market failures, and eliminating fossil fuel subsidies will level the playing field and further drive capital to the right solutions.

Of course, the process of transitioning investments from traditional resources toward the clean economy has already begun. Between 2004 and 2007, clean energy investment increased from \$33 billion to \$148 billion and today

*“The Carbon War Room  
is a global,  
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climate change is  
a business opportunity  
masked as a crisis.”*

accounts for around 10 per cent of global energy infrastructure spend. At the same time, a number of initiatives now exist to educate and encourage investors.

But this is not enough. To be successful we need a fast, pragmatic approach that is focused on reaching the goal of \$550 billion in global clean energy investment per year for the next 20 years, adopting the regulations and legislation necessary to eliminate unintended barriers, and developing insurance products necessary to move on this scale. If we can accomplish this,

it will give Governments and civil society the confidence needed to pass bolder policies to level the clean energy playing field, if not mandate the outcome.

The Carbon War Room — a global, independent non-profit focusing on the belief that climate change is a business opportunity masked as a crisis — aims fundamentally to change the trajectory of humankind’s response to climate change by allowing markets for entrepreneurs to make money for themselves and investors in order to achieve the response the environment and business needs at sufficient speed and scale. More specifically, it targets moving institutional capital into a working marketplace and eliminating such market inefficiencies as insufficient information and high transaction costs.

Investing in the environment can create wealth and jobs while ensuring a sustainable planet. While the politicians of the world have failed to realize this, it is time for business to lead. It is time to shift our focus. Our moment of truth, and of greatness, lies in this opportunity. This is the moment for the world’s citizens to choose to be masters of their fates rather than victims of events at risk of moving beyond control.

## Clean technology: useful links

This page contains links to websites from Governments, international organizations, non-governmental organizations, businesses, media and other groups from around the world to help you research issues related to clean technology. We have compiled these links from our own review of the vast amount of information available on the Internet to help you to find the most relevant sources for your research. Our Planet magazine does not, however, endorse the viewpoints of any of the groups to which we link, and we cannot guarantee the accuracy of the information posted on these sites. Rather, we hope to provide you with a broad range of opinions and perspectives.

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### www.unep.org

#### Sustainable Energy Finance Initiative (SEFI)

[www.sefi.unep.org/](http://www.sefi.unep.org/)

SEFI provides financiers with the tools, support and global network needed to conceive and manage investments in the complex and rapidly changing marketplace for clean energy technologies.

#### Solar and Wind Energy Resource Assessment (SWERA)

<http://swera.unep.net/>

The SWERA Programme provides easy access to high-quality renewable energy resource information and data.

#### en.lighten

[www.enlighten-initiative.org/](http://www.enlighten-initiative.org/)

The UNEP en.lighten initiative has been established to promote, accelerate and coordinate global efforts pushing for efficient lighting.

#### UNEP Risoe Centre on Energy, Climate and Sustainable Development

<http://uneprisoe.org/>

UNEP Risoe supports UNEP in its aims to incorporate environmental and development aspects into energy planning and policy worldwide.

#### Energy website

[www.unep.org/themes/energy/](http://www.unep.org/themes/energy/)

Information on UNEP's key activities to address environmental consequences of energy production and use at the global and regional levels.

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## Resources

#### International Energy Agency (IEA)

[www.iea.org/textbase/subjectqueries/keyresult.asp?KEYWORD\\_ID=4116](http://www.iea.org/textbase/subjectqueries/keyresult.asp?KEYWORD_ID=4116)

The IEA acts as an energy policy advisor to 28 member countries to support their effort to ensure reliable, affordable and clean energy.

#### UNIDO International Solar Energy Center for Technology Promotion and Transfer

[www.unido-isec.org/englishindex/Index.html](http://www.unido-isec.org/englishindex/Index.html)

ISEC-UNIDO is a joint effort between China's Gansu Natural Energy Research

Institute and the United Nations Industrial Development Organization (UNIDO) on solar power research which aims to facilitate the use of green energy in the developing world.

#### Source guide to Renewable Energy

<http://energy.sourceguides.com/businesses/index.shtml>

An international guide to renewable energy companies worldwide, searchable by sector and geographic location.

#### The Renewable Energy Business Network (REBN)

<http://rebn-east.weebly.com/>

REBN enables business professionals with an interest in renewable energy to connect with one another, to promote the growth of the renewable energy industry.

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## Blogs and news

The following sites have clean tech and renewable energy information, including daily news, products, technology overviews, events calendars, job opportunities and investing news.

#### RenewableEnergyWorld.com

[www.renewableenergyworld.com/rea/home](http://www.renewableenergyworld.com/rea/home)

#### Cleantechblog.com

[www.cleantechblog.com](http://www.cleantechblog.com)

#### Cleantech Greentech

[www.cleantechgreentech.com/](http://www.cleantechgreentech.com/)

#### Alternative Energy

[www.alternative-energy-news.info/](http://www.alternative-energy-news.info/)

#### Energy Refuge.com

[www.energyrefuge.com/blog/](http://www.energyrefuge.com/blog/)

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## International Associations

#### International Solar Energy Society (ISES)

[www.ises.org/ises.nsf](http://www.ises.org/ises.nsf)

#### The World Bioenergy Association (WBA)

[www.worldbioenergy.org/node/13](http://www.worldbioenergy.org/node/13)

#### International Geothermal Association (IGA),

[www.geothermal-energy.org/](http://www.geothermal-energy.org/)

#### International Hydropower Association (IHA)

[www.hydropower.org/](http://www.hydropower.org/)

#### World Wind Energy (WWEA)

[www.windea.org/home/index.php](http://www.windea.org/home/index.php)

#### International Renewable Energy Alliance (REN Alliance)

[www.ren-alliance.org/](http://www.ren-alliance.org/)



BELÉN GALLEGO

Founder and Director of CSP Today

# Time to concentrate

Concentrating sunlight to generate energy has been around for millennia. Archimedes, it is claimed, used polished shields to set an invading Roman fleet on fire in 212 B.C.E. And in the fifteenth century Leonardo Da Vinci used large-scale solar concentrators to weld copper. But it is only in the last 200 years that scientists began toying with building solar collectors to generate heat other than lighting fire — and real progress on concentrated solar power (CSP) only really began toward the end of the twentieth century.

The wheels were first set in motion back in the 1860s, when French inventors August Mouchet and Abel Pifre constructed the first solar

engines, but 130 years elapsed before the first of these was connected to a grid. An impressive 8-storey parabolic mirror capable of producing 1 megawatt (MW) was unveiled in France in 1969, but it took a further 16 years for the first CSP plant to come online — in California.

Compared to other renewable energies, like wind and solar photovoltaics (PV), the CSP industry has been slow to get out of the starting blocks. It has been held back by the sheer size and investment requirement characteristic of utility-scale power, perceived investor risk coupled with a weak policy framework to support new technologies, and an unstable economic environment.

Now there are some 1.8 gigawatts (GW) of CSP projects in the global pipeline, with a further 14 GW planned in 16 countries. This may pale in comparison to wind's expected 2010 global capacity of nearly 200 GW, but CSP has a key advantage over both it and PV: it can be coupled with up to 12 hours of thermal storage (using molten salt, stone and air, or phase change materials). This enables CSP to be dispatched to the grid as and when needed, making it a baseload energy that can compete with fossil fuels and nuclear power.

CSP currently sits at the beginning of its cost curve, which is headed one way — down. Comparing the cost of building a 100 MW CSP plant

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with 6 hours storage (\$0.14 cents per kilowatt-hour (kWh)), with that of building a nuclear plant (a conservative \$0.17 – 0.22 cents per kWh) shows it to be cheaper — as well as quicker and cleaner — to deploy. Indeed, if the \$557 billion given annually in subsidies to fossil fuels were removed, some concentrating solar power technologies would already be cheaper than coal, and cost competitive with natural gas.

CSP also has industrial applications, as it can replace natural gas boilers traditionally used for heavy industry applications like enhanced oil recovery and can power desalination plants. At the end of its life, the entire plant can be dismantled in a matter

of months and — whereas nuclear plant decommissioning costs range anywhere between \$100 million to \$17 billion — CSP's are offset by the value of the reclaimed scrap metal.

So how does it work? Like conventional power plants, CSP powers a steam turbine to generate electricity — but by using sunlight. Proven technologies include the parabolic trough, power tower and linear Fresnel systems, which either heat oil to a temperature of up to 370° C in a closed loop to produce steam, or directly produce steam to temperatures up to 500° C.

Power towers already produce direct saturated steam at around 250° C, while a pilot in Israel — the precursor to a planned 370 MW plant in California — produces superheated steam up to 550° C. Fresnel direct steam generators can produce steam at temperatures of 450° C.

Another contender, dish Stirling, does not generate steam to drive a turbine, but uses a mirrored parabolic concentrator dish to concentrate sun onto a receiver, or power conversion unit. This tracks sunlight and heats a gas to temperatures over 600° C to power a Stirling engine that generates electricity.

Dependency on water for cooling plant is a major stumbling block for power generation. A water-cooled nuclear plant requires 720 gallons per megawatt-hour; a coal-fired one up to 520 gallons per megawatt-hour. Most CSP technologies perform better than nuclear and some are on a par with coal. However, CSP relies on near perfect direct normal irradiance (DNI), generally only found in desert-like regions. So obtaining water can be tricky and spark opposition from local people. This has recently given play to more expensive dry cooling technologies. Dish Stirling, however, has a zero water requirement — other than for washing the mirrors.

CSP's dependence on perfect DNI means it is geographically restricted to the earth's sunbelt regions, ruling out its use in cooler latitudes. But deserts receive more energy from the sun in six hours than the world's people consume in a year.

So harnessing this solar resource is vital for Middle Eastern and North African countries like Lebanon and Morocco, which import roughly 97 per cent of their energy. Much of Western Europe will also become increasingly dependent on energy imports as North Sea oil and gas reserves dwindle and so has a vested interest in getting North Africa's CSP capacity up to speed quickly. Europe represents such a vast energy export market that North African countries could become economic powerhouses.

This would require an investment of up to 200 billion euro in transmission, but the return on investment is guaranteed. Furthermore, it would not only open up a vast new energy market, but enable balancing between renewable energies and thus resolve the despatchability issues that are the Achilles heel of wind and PV.

Fossil fuel import dependents are often locked into long-term purchase agreements, and here bridging technologies like hybrid CSP come into their own. Bolting-on CSP plants to existing coal-fired plants in order to augment steam production would enable existing generators to economize on fossil fuel reserves and create much-needed interim demand for relatively new and expensive CSP technologies.

CSP can be used to augment coal and gas-fired power stations as society transitions to clean, renewable energy, and to replace the fossil fuel reliance of today's heavy emitters. In the longer term, stand-alone CSP plants could provide 100 per cent clean, sustainable, and renewable baseload power. It makes the future look much brighter.



ZHANG YUE

Chairman and CEO,  
Broad Air Conditioning, China

# Visiting the future



Two years ago I entered what seemed to be another world — quite different from what I used to know about the West — in Vauban, Freiburg, the solar city that is the green capital of Germany.

Kids played on roads rolling hoops, playing marbles, table tennis and badminton. There were no cars, no cars at all, running in the community. All the cars were confined to two multi-layer parking lots, and most of them belonged to the public: in an emergency anyone can borrow one, but many people can walk to work in five minutes. In the open central square hundreds of people were having dinner, drinking coffee and chatting cheerfully and humorously. There seemed to be happiness and leisure everywhere.

As the sun set I saw solar photovoltaic devices everywhere. House windows had sunshades and their walls were insulated. I saw a new house being built



with 300 mm insulation foam boards, which surprised me greatly because usually thermal insulation is 50 mm thick. But I came to realize that energy conservation is a culture deeply rooted in the hearts of every resident of Vauban. To them, every little bit of energy waste is a sin.

Two months later, I returned with a delegation of more than ten people consisting of my staff, professors of Tsinghua University, Beijing, and bosses of real estate companies. Local architects and officials spoke to us about Vauban, and we ended up with four deep impressions.

The first is of low carbon. All the buildings were built or renovated by residents. All the windows are triple-glazed and have external sunshades. All the walls have very thick thermal insulation and almost all houses have heat-recovery fresh air ventilation. These technologies seem very simple, but they enhance the energy efficiency of buildings by 400 to 800 per cent. The residents consider energy conservation vital, and easy.

Secondly, the residents treat renewable energies very rationally. They know solar energy is the technology of the future. Solar hot water and solar heating work well, but solar photovoltaics is, at present, uneconomic. So the Government subsidizes it paying for electricity exported to the grid at prices three to five times higher than what people normally pay. But, though the residents like solar energy, they know that insulating buildings should come first.

Thirdly, the residents seem to think a happy life is an easy one. They use completely pesticide-free and fertilizer-free methods to green the environment, and never use non-local plants. They make full use of things locally: many slides and other things for kids are made of waste wood and bricks and natural stones — and the children love them.

Lastly, our fourth impression was that neighbours get along harmoniously. The poor do not suffer prejudice, the rich have no fear of being attacked. Their income differences might be ten or a hundredfold yet they live in harmony. Children play on roads or in woods, with no concerns about safety. In China everyone worries about robbery and theft, traffic accidents, and all kinds of attacks, but in Vauban many people never lock their houses.

If a society pursues a low carbon lifestyle, enjoys joy and actualizes harmony in this way, it has reached its zenith. If there were really communism in the world, Vauban would be its exemplar, with what could be called eco-communism. It has nothing costly, fashionable or artificial just low carbon, joy, and harmony that can be summed up in one word: happiness. I will visit Vauban again — even live there for a while.





TENDULKAR

Cricket batting legend and  
UN Environment Programme Goodwill Ambassador.

SACHIN

*"It's just the small changes  
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— small changes will really  
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SAHARA

# TENDULKAR

## BATTING FOR THE ENVIRONMENT

He is, indisputably, one of the greatest cricketers ever to have worn whites, but Sachin Tendulkar is also now becoming known as a leading green. The greatest run-scorer in history — and the only current player regularly to be voted by experts on to all time World XIs — he has now embarked on a campaign to use his global popularity to raise concern about the environment and inspire people to take action to look after it.

"I have played and enjoyed my cricket across the planet," he says. "Now it is time to do something for it, our only home." And typically he has started with himself.

"Myself and my family, we have been practising one thing," he said in an interview with UNEP TV. "We have stopped having showers at home and just use one bucket each to bathe ourselves. We have to start somewhere. If I have one shower, what difference does it make? But if 1 billion people think like that, it's a different story altogether.

"It's just the small changes in day-to-day life — you don't have to change your lifestyle dramatically — small changes will really help us save the planet. Simple things like switching off a light, or a fan or the air conditioning, when you leave a room: if you're not using it, why waste energy?"

"We in India have a population of 1 billion people. If all those people decide to do this, can you imagine what a change it can bring?"

But Tendulkar is not stopping at that. Widely revered, but remaining remarkably humble and self-effacing despite being India's most popular sportsperson, Tendulkar epitomizes the sport in his country in more ways than one. Mirroring his green approach, the enormously successful Indian Premier League is calculating its carbon footprint, with UNEP's help, with the aim of becoming climate neutral.

It is examining ways of reducing the overall environmental impact of

its operations, from waste management to energy efficiency and water conservation, and aims to green its merchandise and ensure new Indian cricket stadiums are built to sustainable standards. And the League's captains, including Tendulkar, made a public pledge at the launch of the 2010 season: "The Earth is our home and together we must conserve our precious wildlife, forests and oceans. I am proud to pledge that I will play my part in caring for our natural heritage."

And now Tendulkar has a new green distinction to add to his many sporting ones, being appointed UNEP's Goodwill Ambassador, this year. "Being part of the effort to save the planet is an immense undertaking, but it is a challenge I am ready to accept," he says.

"If we can all come together and take these small steps in the right direction, we can make this beautiful planet worthy enough for the next generation and the generation after that. Together, we can do it."



[www.unep.org/ourplanet](http://www.unep.org/ourplanet)



2010 International Year of Biodiversity