RTCC

Responding to climate change

Global innovation, technology and business solutions to tackle climate change.

Respond

COP17 Durban

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FOREWORDS

LIVING

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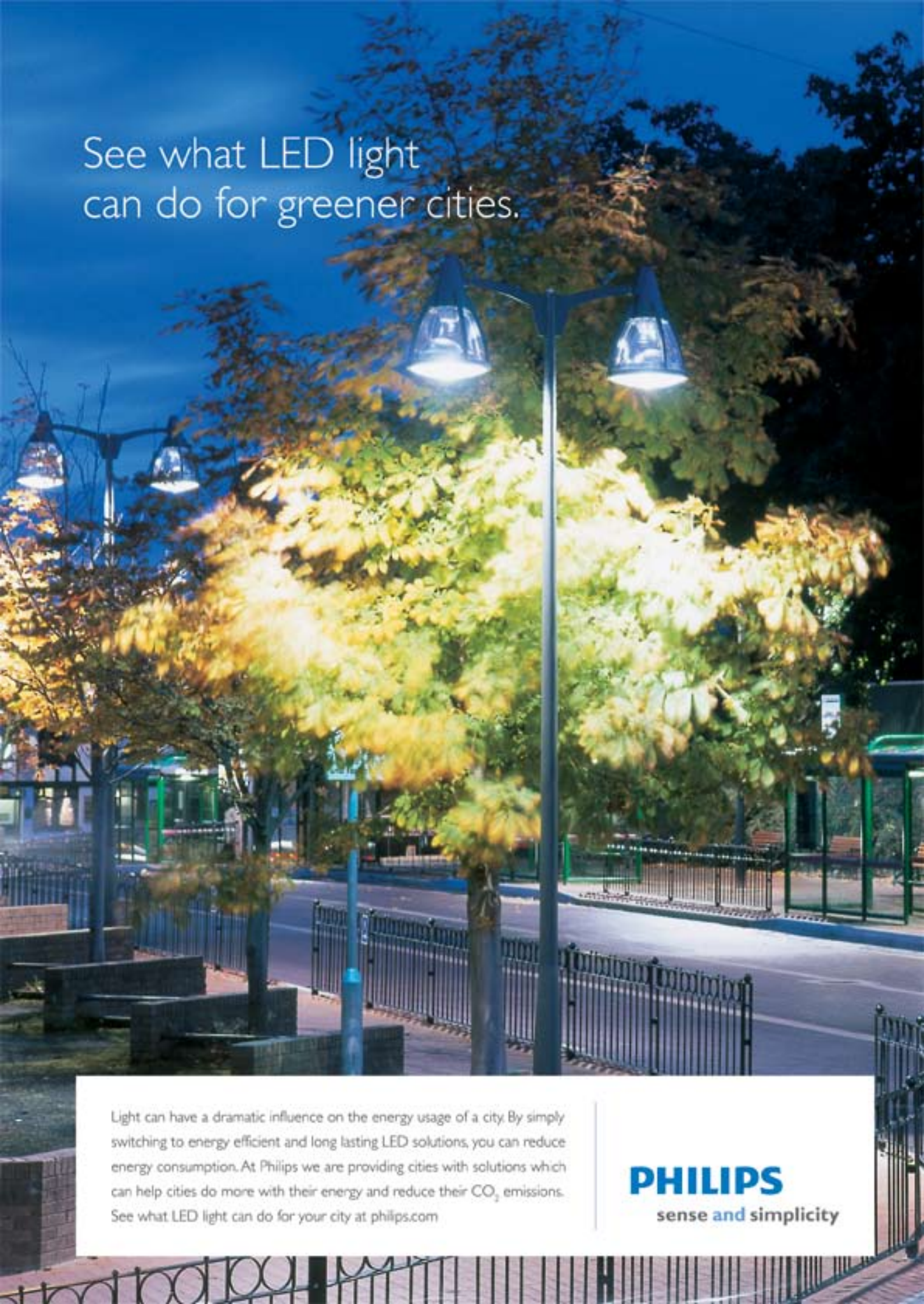

Light can have a dramatic influence on the energy usage of a city. By simply switching to energy efficient and long lasting LED solutions, you can reduce energy consumption. At Philips we are providing cities with solutions which can help cities do more with their energy and reduce their CO_2 emissions. See what LED light can do for your city at philips.com

PHILIPS
sense and simplicity

Ms. Maite Nkoana Mashabane,
Minister of International Relations and Cooperation and Incoming President of COP17/CMP7, South Africa

As the incoming UNFCCC COP17/CMP7 President, we have a mammoth task of ensuring countries deliver an acceptable, fair, transparent and equitable deal in these climate change negotiations in Durban. Inclusivity, wide participation and transparency are important priorities for South Africa, and we will make a particular effort to engage with countries that hold minority positions and other major groups.

The key issues and priorities for Durban are achieving a balance between the Bali Roadmap and operationalising the Cancun Agreements, as well as striking a balance between and within the Convention and the Kyoto Protocol negotiating tracks. In an effort to narrow and overcome the divide between developed and developing countries on the expected outcomes of Durban, South Africa has been promoting the sharing of views and ideas around climate change in the build-up to the negotiations.

It is critical that governments and nations assess the range of risks and plan to reduce vulnerability accordingly. The impact of climate change on our country, our continent and our world cannot be underestimated. Scientific evidence has shown it will have a lasting negative impact on the world as we know it and, indeed, the effects have already begun to be felt. The number, frequency and intensity of weather and climate-related hazards are significantly increasing worldwide and the environment and economies of the developing world – the African continent in particular – will be the hardest hit, but no country will be spared.

Climate change will negatively affect a sector of society already carrying the burdens of underdevelopment, poverty, lack of education and opportunities, namely women. With all the destruction climate change brings, women are literally on the frontline of picking up the pieces and, as the carriers of development, ensuring the survival of our communities.

In both flood and drought-prone and regions, women have to deal with the impacts and fend for their families. The current famine in the Horn of Africa shows the devastation climate change can have. In Somalia, the prolonged consequences of climate change are playing themselves out in a context of a country torn by civil strife. We have all seen images of women bearing emaciated children dying in their arms from hunger-related diseases caused by prolonged drought famine.

We must work together, as a global community, to make sure the causes of climate change are urgently addressed before more lives are lost and irrevocable damage is done to our planet.

Alone we can never achieve the critical outcome we all aspire to. It is our hope this spirit will infuse the negotiations and ensure we consolidate the gains made, and address the big political issues as well as the future in good faith. Yes, we all have our own national interests, but we need to rise above these and find innovative solutions. The Parties need to lead and be bold. Working together we can save tomorrow today!

www.cop17-cmp7durban.com

Minister Maite Nkoana-Mashabane,
incoming President of COP17/CMP7

Join me in welcoming the world to Durban.
South Africa is ready.

COP17/CMP7

UNITED NATIONS

CLIMATE CHANGE CONFERENCE 2011

DURBAN, SOUTH AFRICA

Working Together: Saving Tomorrow Today

Climate change is one of the greatest threats to sustainable development and demands that the COP17/CMP7 Conference in Durban puts in place necessary building blocks to deliver a balanced agreement that takes historical responsibilities into account.

For South Africa, taking meaningful climate action is about seizing the opportunity to build international competitiveness, new economic infrastructure, sectors and activity; create prosperity and jobs; transform the economy and society; reduce poverty; improve health and quality of life for all.

28 November - 9 December 2011

Jean-Guy Carrier,
Secretary General,
International Chamber of Commerce (ICC)

Building creative and innovative partnerships between policy makers and business is critical to economic growth, social progress and environmental responsibility. The private sector has a crucial role in delivering economically viable solutions for a transition towards a green economy.

Business has already demonstrated considerable success in integrating sustainability into business practices, for example via voluntary codes like the ICC Business Charter for Sustainable Development, which has provided thousands of large and small companies around the world with the basis for sound environmental management. Other examples include reporting initiatives, such as the Global Reporting Initiative (GRI), standards and guidance such as ISO 14001, voluntary sectorial approaches and "soft law" approaches, such as the OECD Guidelines for Multinational Enterprises. Companies in all sectors have taken concrete actions, from reducing environmental impacts across value chains to increasing energy and resource efficiency, investing in low-carbon and renewable energy and reducing waste.

But more needs to be done if we are to meet economic, developmental and environmental challenges. Efforts by all actors need to reconcile bottom-up sustainability efforts with the need for a longer term systemic change of macro political economic models.

A "green economy" must ultimately function in a self-sustaining way and become integrated in international and global markets.

In June 2012, world leaders will meet in Rio for the 20th anniversary of the United Nations Conference on Environment and Development (Rio+20). It is a time for reflection on what has been achieved and what still needs to be done, including the challenges and progress made on climate change post-Durban. As companies operating across countries and value chains, we understand the need to deal with a challenge such as climate change in a global and cooperative manner. We strongly encourage governments to implement the UNFCCC Cancun agreements in Durban and work towards a truly global agreement on climate change, while establishing effective domestic policies to deal with climate change.

ICC's fundamental mission is to promote trade and investment across borders to help meet the challenges and opportunities presented by globalization. Very early on ICC understood the need for action on environmental issues and has a rich history of leadership dating from the 1980s, e.g. the UNEP-ICC World Industry Conference on Environmental Management (WICEM). In this manner, ICC has never limited itself to policy advocacy, waiting for governments to solve problems.

Just this year ICC launched its G20 Advisory Group, a CEO-led platform for global business to provide input to the work of the G20 heads of state and government on topics such as green growth, commodity prices, trade and investment. Drawing on the expertise of our global network, ICC also helps spread best practice among companies and has developed a large array of voluntary rules, guidelines, and codes that facilitate business across borders, such as a model contract on international transfer of technology.

As the official business and industry focal point in the United Nations Framework Convention on Climate Change (UNFCCC), and a founding convener of Business Action for Sustainable Development (BASD) 2012, the official business coordination for Rio+20, ICC continues to be deeply committed to helping build partnerships so all actors can meet their shared responsibilities in continuing to implement the objectives of sustainable development.

We will remain a steadfast rallying point for those who believe, like ICC's founders, that strengthening commercial ties among nations is good for business, good for world living standards, good for the environment and good for peace.

Do you have **2050vision?**

In the build-up to Rio+20 Responding to Climate Change aims to develop a 2050 City of the Future. We'll focus on the key technologies, policies and business decisions that will need to be made in order for the world to move to a truly low-carbon economy.

If you've got a **2050vision** you'd like to share we would love to hear from you…

– Explain how your business is preparing for 2050
– Tell us what innovations will dominate the next 30 years
– Describe what cities could look like in 2050
– Write your own message to politicians in Rio+20

PLUS: Don't miss the Responding to Climate Change Musical production during COP17 with the children of Addington Primary School – check rtcc.org for more details.

For more information:

Email ed at **ek@rtcc.org**
Tweet **#2050vision @rtcc_edk**
Visit **www.rtcc.org**

RTCC
Responding to climate change

Mr. Konrad Otto-Zimmermann,
Secretary General,
ICLEI

Climate change is arguably the greatest challenge of our generation, and it will stay with us for generations to come. We are facing a global challenge which needs to be tackled on a globally coordinated scale. The solutions, however, need to take into account regional and local circumstances and engage local communities in the implementation to be most effective and efficient.

In the field of 'climate governance', cities and local governments have achieved a tremendous success at the UN climate talks in Cancun in December 2010. A major goal of the Local Government Climate Roadmap that started in Bali in 2007, was the recognition that local governments shall have a more active role in global climate governance since they are elected representatives with political and economic power. Before Cancun local governments were tied into the category 'non-governmental', not doing justice to the crucial role that local governments play in implementing policies and measures against climate change. For the first time in UNFCCC history, the tireless work of local governments at the negotiations has resulted in a reference to local governments as 'governmental stakeholders' in official documents at COP16. We had expected very little from Cancun, but in the end managed to achieve a key goal we had been aiming for for decades.

While cities and local governments have reached their first objective of being recognized as 'governmental stakeholders', the Local Government Climate Roadmap laid out two further climate governance goals we are still working towards. The second objective is to be fully engaged in the process of designing a framework for climate action and in the decision-making process. The third objective is to be empowered to take action. Our expectation for COP17 is that the global climate change regime continues to further engage local governments as key actors, and that negotiations, for example on the Green Climate Fund, will focus on empowering local governments to implement the much needed climate change solutions.

Cities and local governments are implementing climate-related decisions and policies locally every day, and they will continue to implement climate change solutions even without a much needed global framework to support them. If a flood hits a town, the Mayor may not be able to wait until the next round of climate talks has produced a post-Kyoto agreement. The local reality can be very different from the global reality. However, in order to be able to act, cities need to have more funding, capacity and an enabling policy framework.

Cities and local governments are the ones implementing climate change action, and as 'governmental stakeholders' they should be an integral part in the decision-making process. They also need to be structurally encouraged and supported to put forward funding proposals that are designed on the basis of local needs, to ensure that climate action is done most effectively and with the greatest possible impacts. At COP17 we will again be holding up the flag for locally designed policies and actions that will enable citizens and communities to manage the impacts of climate change in the most effective way, and thereby contribute to national and global climate change goals.

FOREWORD

Ed King,
Editor,
Responding to Climate Change 2012

I have a confession to make. For the past few weeks my focus on COP17 has been ever so slightly distracted. While texts on the mechanisms and policies that underpin these talks have gathered dust on my desk, I have been in complex discussions with choreographers and actors. As the political rhetoric has increased, so has my time spent away from the computer and next to a stage.

There is method to the madness: RTCC is putting on a musical at this year's Conference. Performed by local children, it provides a child's perspective on climate change, and illustrates why this annual event is so important. When you strip away the figures, arguments and analysis, climate change is ultimately about humanity.

Yet while climate change for many is an example of how mankind is failing, for RTCC it has also proved inspirational. Flick through this year's magazine and you will read tales of technological wizardry that give us all hope. Universities across the globe are breaking new ground in their research into climate change and mitigation techniques. Big business is coming to the table with plans for zero-emission aeroplanes and innovative forms of renewable energy.

While a binding global deal appears distant, the Clean Development Mechanism, Technology Mechanism and Green Climate Fund all offer paths to a low-carbon future. In particular the Technology Mechanism has the potential to incentivise a green economy across the world, and at RTCC we eagerly await the discussions that will determine its future during this summit.

You will also read about our new website in the magazine. Launched a few weeks ago, we aim to cover climate change 24 hours a day, 365 days a year. It is the first website of its kind and we hope you find it informative, illustrative and thought-provoking. At rtcc.org you will find interviews from inside the conference together with news and analysis from our team here in Durban – and of course details on the musical.

Ed

Responding to Climate Change (RTCC) is a Non-Governmental Organisation and an official observer to the United Nations climate change negotiations dedicated to raising awareness about climate change issues. RTCC officially supports the United Nations Framework Convention on Climate Change (UNFCCC) in its outreach programme through Climate Change TV.

Living: Solutions start at home.

Each of us can take steps to cutting carbon emissions and conserving energy. Turning the lights off, insulating our houses, installing efficient heating systems and using less water are all ways of doing our bit. RTCC is excited by how little it costs to make a big difference.

Find out more at: rtcc.org/living

URBANISATION – SEEING THE LIGHT EFFICIENTLY

LED street lighting in Africa

The world's population is rising fast, and we are going through a period of unprecedented urbanisation. Today, more than half of us call cities our home. Twenty years from now, this figure will have risen to some 60%, and by the middle of the century over two thirds of us will live in urban areas. That's some three billion extra city dwellers, most living in rapidly expanding conurbations in emerging economies, like China, India and also in Africa.

Clearly, the sharp rise in the urban population offers great opportunities for economic and social development. But at the same time it presents cities with enormous challenges, ranging from cutting back energy consumption, reducing greenhouse gas emissions, securing a reliable energy supply and ensuring public safety to maintain a sense of community among an ever-growing number of city dwellers.

A Malaysian motorway

Lighting company Philips provides meaningful, high-quality, cost-effective and hassle-free solutions that help city authorities address the challenges they are confronted with, especially in the current era of constrained budgets. The wave of innovative sustainable LED lighting technologies offers huge new possibilities for highly energy efficient LED city lighting, that realise impressive energy savings, especially when combined with 'intelligent' lighting and control systems, enabled by ICT.

Earlier this year, the Malaysian Ministry of Works selected the Philips energy efficient LED lighting to light up three stretches of roads leading to Subang Airport, Federal Highway and Middle Ring Road 2. The bulbs emits high-quality, neutral cool white light, providing visual safety to drivers and motorcyclists. By switching to LED technology, the Malaysian Government saves over 50% in energy consumption while cutting in its carbon emissions in half. This helps the Malaysian government realise its plan to accelerate the implementation of energy-efficient solutions, while at the same time creating liveable, vibrant and safe city areas.

Royal Philips Electronics of the Netherlands is a diversified health and well-being company, focused on improving people's lives through timely innovations. Philips employs over 120,000 employees with sales EUR 22.3 billion in 2010 and services in more than 100 countries worldwide.

Philips Lighting is the leading provider of lighting solutions and applications both for professional and consumer markets, transforming how lighting is used to enhance the human experience in the places where people live and work. Philips Lighting employs approximately 53,000 people worldwide.

The Hangzhou Canal

LIGHTING FROM THE SUN

And that's not all. Recent innovations in LED lighting and solar technologies are enabling reliable off-grid solutions that are even more sustainable and provide high-quality, cost-efficient lighting using sunlight instead of conventional electricity. This highly sustainable solution is especially valuable for towns and cities around the equator, which can capitalise on the many hours of sunlight to supplement the capacity of their conventional electricity grid – and so address their growing concerns about their ability to meet the steep increase in energy demand.

Solar-driven LED streetlighting Guiyang, China

In partnership with The Climate Group and the One Foundation, Philips has lit up the streets of the Guiyang community in China. During the day, a solar panel converts solar energy into electrical energy that is stored in a battery. When night falls, the battery discharges, releasing the power for the LED luminaire to light the road.

Philips has managed to develop the most effective and cost-efficient solar driven LED, including theft prevention, that people can rely on if the electricity grid fails. It literally sheds light on the lives of some 1.6 billion people, who don't have access to the grid, after sunset.

ATTRACTIVE CITIES

For the city of Hangzhou in eastern China, urban planners wanted to find a way to attract business and tourism and bring communities together. The key aim was to bring more areas of the city to life, to give its residents outdoor spaces where they can breathe and live.

Using LED lighting and working in partnership with Philips, these urban planners lit up an iconic section along the city's 2,000-year-old canal system, choosing a blue-green colour palette to highlight the spaces in a dramatic and enchanting way. The versatile lights not only use less energy than the municipality had originally expected, they've also transformed the entire area, bringing people out of their homes and creating communities that otherwise would not have existed.

Sustainable energy efficient lighting helps cities express their unique identities and truly shine on the global map, making them safe, cost-effective, connected and beautiful places to live and work.

Philips Lighting
www.philips.com
www.asimpleswitch.com

PHILIPS
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ZIMBABWE'S POTENTIAL IS ELECTRIFYING

Electrified public rural institutions
71.1% of secondary schools
39.6% of primary schools
66.1% of rural health centres
82% of Government Extension Offices

Zimbabwe has not been spared the troubles of power shortages bedevilling the region. 96% of institutions are connected to the national electricity grid network which is mainly coal powered, causing carbon emissions resulting in global warming. The government has the daunting dual task of developing solar energy and other renewable energy technologies, targeted specifically at rural communities.

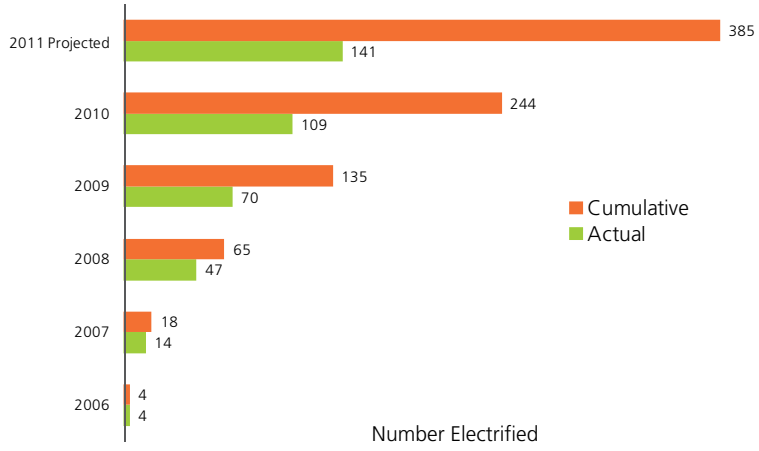
Where communities do not have a regular power supply; schools have a low pass rate and high staff turnover, hospitals show a high mortality rate and there is a higher rate of rural to urban migration. Since 2002, the Rural Electrification Agency has facilitated the rapid and equitable electrification of rural areas through grid electricity and off-grid power sources such as solar systems and mini-hydros.

Homes and institutions that benefit from the off-grid stand-alone technologies are remote and located far from the national electricity grid network. These stand to be disadvantaged if only grid projects are implemented as the extension and development of the national grid network is highly capital intensive.

Technology is not restricted to the cities but has spread into the rural areas because of the electrification programme. The Agency has through its dedicated efforts in promoting energy intensive projects empowered the rural communities, created employment and is helping curb the rural to urban migration. As a result, under the Rural Electrification Programme, over 6,000 institutions were electrified through the grid and 247 institutions through solar power. Of this, 500 (1.2kw) solar mini grid units have been installed under the Solar Programme, thanks to a financial grant from the Italian government.

The achievements highlighted have resulted in the attainment of the Millennium Development Goals. There has been a notable improvement in the pass rate for some rural institutions under the Rural Electrification Programme through extended study hours, use of computers, better laboratory facilities and reduced staff turn-over. Improved refrigeration facilities for drugs and use of electricity powered clinical equipment have seen a remarkable improvement in the health service delivery through rural health centres.

Solar Electrification Trend for The Period 2002 to 2011



PAY THE PIPER

The level of contribution towards project implementation is dependent on the customer type. There is 100% capital subsidy for public institutions; 50% capital subsidy for community initiated projects and no subsidy for individual homesteads.

Beyond this, the pace of implementing such projects is heavily determined by availability of funding resources. A levy of 6% of electricity sales is the Agency's major source of funding, but it falls far short of requirements. Over US$250,000,000 is required to electrify the outstanding public institutions.

The policy focus is on using renewable energy technologies. To ensure the attainment of such sustainable intent, the Agency is seeking strategic, technical and financial partnerships with regional or international developmental and funding agencies or institutions interested in the development of clean and renewable energy sources.

Zimbabwe has ideal climate conditions and water sources conducive to the development and construction of photovoltaic power plants, solar systems and mini hydro power stations. The country's rural communities present a ready market for green energy. Indeed, the global interest in solar power growth, its cost-down and efficiency-up approach shows solar energy is a sustainable solution to the country's power shortages and delay in economic growth. The potential, skills and supportive policy framework exists for Zimbabwe to join the global drive on the implementation of renewable energy technologies, provided funding resources are made available.

Rural Electrification Agency
www.rea.co.zw

GOING TO THE MATTRESSES – ITALIAN REGIONS FIGHT CLIMATE CHANGE

Inter-institutional cooperation is crucial to tackling climate change and increasing ambition. Local authorities are continuing to voluntarily increase energy efficiency and use of renewable energy sources on their territories.

With a population of 1,343,000 (below the national average), the Abruzzo region is found at the centre of the Italian peninsula bordered on the east by the Adriatic and on the west by the Apennines. Covering over 10,500 km^2, this is one of the most mountainous regions in Italy.

Although tourism has increased substantially, its protected areas are environmentally important and are home to rare flora and fauna, such as the brown bear, the wolf and the chamois.

The region with its 305 municipalities and four Provincial governments signed up to the EU Covenant of Mayors in May 2010.

Italian regional authority, Abruzzo Region explains how the Covenant of Mayors is the mainstream European movement bringing together local and regional authorities of all sizes. Its signatories aim to meet and exceed the European Union 20% CO2 reduction objective by 2020. As a shared energy policy, the "Covenant of Mayors" is outstanding, and is considered, at the European level, as best practice to be disseminated and replicated.

Also supporting local government is the National Association of Italian Municipalities (ANCI). Set up in 1901, this association represents over 7,100 municipalities across the country.

Abruzzo and its four provinces, along with ANCI, have established a management group to coordinate all the activities necessary to fulfil the Covenant. The members of the group are the Presidents of the provinces and their delegates, the ANCI contact person for energy issues in Abruzzo, as well as provincial and regional technical directors. This is, in fact, the first case of territorial governance that involves all public and private administrations.

These activities will be crucial in achieving the objectives of the Covenant, both to support decision making and for the use of financial resources. Abruzzo Region has allocated the entire energy resource, 38 million euros, to support the start-up.

These funds are being directed to interventions on public buildings, primarily on school buildings, to reduce their energy consumption. Other interventions are aimed at developing renewable energy installations, for the self-efficiency in public buildings. Attention is also being paid to education of technicians and operators in the sector to acquire experience in more developed regions.

A strong training programme is also planned in schools of all levels with the project, Energiochi, in collaboration with the Universities of Abruzzo to teach school children energy subjects. More information is available at ***http://energiochi.regione.abruzzo.it***.

A key issue for the municipalities of the Covenant of Mayors is the preparation, within one year of accession, of the Municipal Action Plan (Sustainable Energy Action Plan - SEAP). In the Abruzzo Region the Municipalities were supported in the drafting of the SEAP by different bodies and institutions, such as local energy agencies, universities, and public bodies.

In the field of renewables, Regione Abruzzo is a partner in many European projects, and also OECD for the development of new renewable energies and in particular biomass as an opportunity for development of the small rural communities.

Regions are gathering together, sharing knowledge, to create a local low-carbon economy, demonstrating how investing in climate change fosters innovation and improves international competitiveness.

Regione Abruzzo
www.regione.abruzzo.it

MOROCCO SEES THE RENEWABLE ENERGY LIGHT

Over the last decade, Morocco has enjoyed strong economic and social growth. This has propelled a sharp increase in its energy needs: various forecasts bank on a significant increase (doubling for 2020 and tripling for 2030) for both primary energy and electricity demand. To tackle this, Morocco has defined a new energy strategy which places environmental protection and energy independence at the centre of its priorities.

Masen, a limited company with public funds, was created in March 2010, by the law 57-09. It is responsible for the realisation and the implementation of the Moroccan Solar Plan by Horizon 2020.

Masen creates the conditions for the emergence of a local solar industry, a network of research and development and in the required capacity building.

The Kingdom's long-term vision depends on using renewable energies, be it hydraulic, wind or solar. By 2020, the installed capacity from renewable sources will represent 42% of total capacity, fairly split between these three sources. As incentives for the industry, integrated national plans incorporate favourable legal, institutional and financial elements, creating an environment for renewable energy to flourish.

One aspect of this is the Moroccan Solar Plan, promoted through the Moroccan Agency for Solar Energy, Masen. It is a concrete, ambitious answer to the country's energy and environmental concerns, and is focused on ensuring the long-lasting availability of energy, a prerequisite to its sustainable development.

PLAN TO SUCCEED

Five sites have been identified to hold solar power plants, using different technologies, with a minimal total capacity of 2,000 MW. The estimated investment is in excess of nine billion US dollars. These projects would allow for an annual saving of 3.7 million tons of carbon dioxide. In line with a sustainable development approach, the plan revolves around three main points:

1. The development of solar power plants – this covers initial studies, design, financing and will be done either directly or through a concession to independent power producers.
2. The development of local expertise – this encompasses:
   - Applied research and promotion of technological innovation.
   - Identifying and implementing policies and measures to ensure the country's solar industry is integrated and competitive.
   - Contribution to the development of capacity-building in the field of solar technology.
   - Optimisation of local development in the region of solar plant sites.
3. Be a noted influence on the national and international level in the solar energy field through various regional and industrial initiatives.

PLANNING IN ACTION

The Ouarzazate Solar Complex, with a capacity of 500MW, is the first outcome of the plan. The tendering process of the first phase of this complex, which uses the parabolic trough technology (with a gross capacity of 125-60 MW), under an Independent Power Producer (IPP) scheme, is on schedule.

The next phases, of which at least one will be dedicated to photovoltaic technologies and another to tower solar technologies, will be launched before 2012, and the total capacity of the complex will be reached in 2015.

The Kingdom of Morocco is one of the most involved countries in reflections around solar energy and its large-scale deployment. It intends to become a key actor in the field on a regional and international level.

Moroccan Agency for Solar Energy (MASEN)
www.masen.ma

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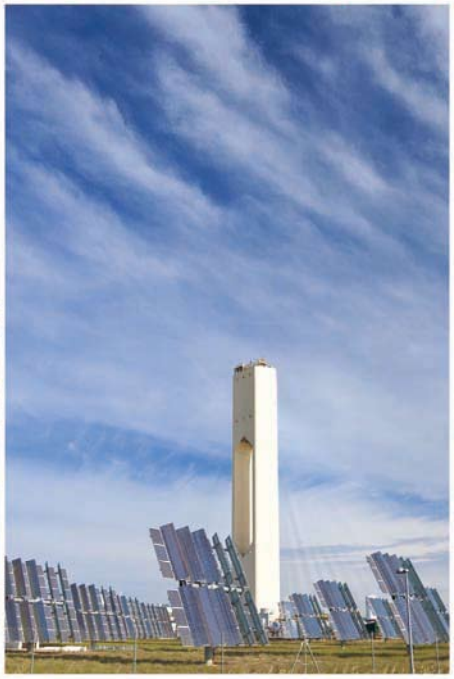
Moroccan Agency for Solar Energy

masen
Moroccan Agency
for Solar Energy

Moroccan Solar Plan Developer



www.masen.ma

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PASSING THE EMISSIONS PEAK IN SOUTH AFRICA

Meeting the demands of the Kyoto Protocol starts with the highly industrialised and energy-driven regions of the world. Environmental challenges around food, energy, sanitation and water security are prohibitively expensive, and continued migration and population rises, with inevitable impacts on land and transport availability, severely test the sustainable development initiatives in place.

The Gauteng Economic Development Agency (GEDA) in South Africa discusses their Integrated Energy Strategy (GIES) for a low-carbon economy with green jobs and accessible, affordable clean energy services. The associated Climate Change Response Strategy will position the province as a renewable energy innovation and excellence hub and their Renewable Energy Investment Strategy promotes private sector investment.

GIES THEMES

- Local food production
- Solar water heaters
- Energy efficiency campaign
- Concentrated solar power
- Water and waste management
- Green transport

MANY HANDS – THEMES AND PROJECTS

Under GIES, GEDA has themes and projects it is following, working with municipalities and the private sector to lead a green economic revolution. Municipal initiatives include solar energy and ethanol-powered public transport. Committed to ensuring energy access for the poor as a priority, the agency is aiming to pass its carbon emissions peak and start declining by 2030.

One example is the Baragwanath Hospital in Soweto, the biggest public hospital in Sub-Saharan Africa. This is being removed from the grid and will be entirely powered by solar energy and other clean technology.

The local food production plan is set to generate over 60 million euros, creating nearly 450,000 direct jobs. Producing solar water heaters will contribute over four million euros a year for 15 years, with an annual carbon revenue of over one million euros per year. Using these heaters will save, at the very least, 2,9TWh and create over 6,700 jobs.

As the country's largest waste producer, with over 5.7millions tonnes of waste yearly, GEDA is encouraging mandatory recycling efforts with some small, medium and micro enterprises already signed up. Other projects include:

- The creation of two buy-back centres as the first step to establishing regional recycling clusters.
- With over 12 vehicles converted to use Compressed Natural Gas (CNG), a refuelling facility has been set up, with more points planned, and the Green Transport Centre in Midrand-Johannesburg enables vehicles to be converted to full electric.
- Through the Automotive Industry Development Centre (AIDC), a cleaner production programme targeting manufacturing firms, involves initial energy assessments and next steps.
- An LPG Taxi Conversion Programme with the AIDC will have up to 150 taxis operating dually on LPG and petrol by end of 2011.

The Gauteng Economic Development Agency (GEDA) is an agency of the Gauteng Department of Economic Development in South Africa.

With the province contributing almost 10% of the continent's GDP and over 40% of South Africa's, Gauteng is one of the biggest economic forces in Africa.

- A landfill gas project, piloted by the AIDC with the City of Tshwane and a Rosslyn automotive assembler, is at the pumping trials stage, as well as undergoing financial evaluation to prove viability.
- A Foundry Sand Recycling project is examining how to declassify the waste and render it non-toxic and re-usable in foundries or the construction sector.
- The Moringa Oliviera Food Security Project is plucking opportunities from Moringa Oliviera trees around the development of products in the health, food, pharmaceutical sectors. Much initial work has been completed already, and negotiations have begun for uptake of leaf, oil and seedcake products by the private sector.
- A 150MW photovoltaic plant is being set up in Kungwini.

Also in the pipeline is a Green Industrial Development Zone, promoting investment in Research & Development and local manufacturing. The agency wishes to increase the flow of fixed direct investment to retain existing key businesses and to increase investment and employment opportunities in strategic sectors such as agro-business, tourism, manufacturing and services.

Gauteng Economic Development Agency (GEDA)
www.geda.co.za

The Chris Hani Baragwanath Hospital
© Robert Cutts

GEDA
GAUTENG ECONOMIC DEVELOPMENT AGENCY
SOUTH AFRICA

Gauteng Promoting Green Investment

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REPUBLIC OF SOUTH AFRICA

TAKING SPATIAL AWARENESS TO A NEW LEVEL

Policies and plans around spatial planning need to focus more on adaptation than they do currently. The DHV Group of companies, with its mantra of "Serving our living environment", explains how they are doing this.

URBAN ENVIRONMENTALISM

DHV is closely involved in expansion programmes for three Chinese cities: Cangzhou, Caofeidian and Tianjin. In all cases, the question is how to reconcile expansion with a shortage of fresh water, the risk of flooding and the aims of nature conservation. The group is working alongside partners such as the Chinese planning institute Qinghua, the British consultancy Arup, the Dutch knowledge institute Alterra and Dutch architects Architecten Cie.

Massive mudflats lie off the coast at Caofeidian, today a modest sized city on the shores of the Bohai Sea, yet in just a few years' time, one million Chinese will be living there. With industrial parks and a massive port complex, the expanded city will serve as a new economic powerhouse for northern China. It will belong to a new generation: compact, adapted to existing environmental conditions, low on energy consumption and CO2 emissions, and with extensive facilities for collecting and reusing fresh water.

"By Chinese standards, this is a revolutionary approach", says project leader Dick Kevelam and Tiffany Tsui business developer, who is helping to plan the massive project. "The Caofeidian of the future will be much more compact, with metro and light rail lines and particular attention devoted to wind and solar energy."

Necessity is not the only factor driving the push for sustainable urban development in China. Environmental awareness is very much on the rise, says David Ji, Director of DHV China. "Sustainable development is high on the national policy agenda, and a great deal of attention is devoted to new spatial planning methods. We really have no choice, given the current growth of the Chinese economy and population. In this country, the Eco City concept is the only solution for accommodating such massive growth."

MANAGING THE SETBACKS

In South Africa policy formulation is key to the management of impacts of climate change. The impacts of climate change will be most acutely felt in coastal areas, where oceanic and terrestrial forces meet. The coastline has witnessed a marked increase in the intensity and frequency of extreme storms in recent years, bringing coastal erosion and shoreline retreat into sharp focus, elevating these issues onto policy agendas countrywide.

A potential solution to these unpredictable events is the proactive determination and implementation of realistic development setback lines. The Western Cape Department of Environmental Affairs and Development Planning appointed local DHV Company SSI, in partnership with Andrew Mather and Cullinan & Associates, to develop coastal setback lines for the coastline of the Overberg District Municipality.

The objective is to use detailed survey information and contributions from affected stakeholders to delineate setback lines for the 300km coastline between Rooi-Els and Cape Infanta. Two draft setbacks, a coastal processes line and a limited development line, have been determined. The fine-scale demarcation of the lines was informed through an analysis of coastal zone processes such as wave action, erosion or accretion trends, dune migration, as well as the location of existing developments.

DHV Group of Companies are internally mandated to deliver all projects in the most sustainable manner possible, no matter how small or large the project may be or where it is undertaken on the globe.

The DHV Group is a global provider of consultancy and engineering services in the following markets:
- Transportation and Aviation
- Water
- Building and Industry
- Spatial Planning and Environment.

Active worldwide through a network of local offices in Europe, Asia, Africa, and North America, DHV operates in more than 30 countries and employs over 4,500 specialist engineers, scientists, technologists and support staff.

The DHV Group
www.DHV.com or www.SSI-DHV.com

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The longer we wait, the harder the problem is to solve.

The best response to the effects of climate change is proactive intervention – based on best practice solutions from knowledgeable practitioners.

The DHV Group is a 94 year old knowledge-based consultancy with global reach, delivering cutting edge integrated engineering and environmental solutions, in more than 70 countries. The Group has an appetite for problem solving and has demonstrated expertise in both developed and developing nations, contributing to the quality of life of millions whilst leaving the planet in better condition than they found it.

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LOCAL ACTION TO GLOBALLY FIGHT CLIMATE CHANGE

Climate change is an inevitable reality which has now come to stay. Anticipating and mitigating its effects, above and beyond ideologies and flags, are some of the biggest challenges humanity is coping with. The continued existence of our society and our kind is at stake.

From the United Nations to the remotest community on the planet, there is neither a government nor an administrative department in the world that isn't one way or another involved in the immense common effort to fight climate change.

Nowadays, the well-known expression think global, act local acquires great significance spread over all levels of human activity. There isn't a gesture, how unimportant it might seem, that doesn't contribute to the increase or mitigation of climate change effects. But, at the highest level, agreements to reduce emissions are lacking.

We need to stimulate renewable energy sources, which will reduce our dependence on fossil fuel, and assess new alternatives which will allow us to combine the individual and social development of the human being with protection of the natural environment.

We need to reorient the global economy to new models based on saving and efficiency of energy, converting the environmental challenges into new opportunity areas which favour a new and balanced global development.

But, just as important as all these global movements, are the simple gestures which improve our environment and slow down the continuous depletion of our planet. I'm referring to apparently insignificant actions like the use of the wastepaper baskets, like separating urban waste to facilitate its recycling or making use of bicycles and public transport to travel to the city.

In many cases, the most difficult thing is to change one person´s habits and this effort depends on the municipalities and the local authorities as the administrative department closest to the citizens.

Bilbao, in Spain, is the capital of Biscay, in the Basque Country. With a population of over 350,000, it is the tenth largest city in Spain.

It is a city with a strong personality, which looks after its traditions by opening the doors to the future. The River of Bilbao, an active and silent witness to the history of the town, links the Casco Viejo, the medieval heart of Bilbao, to the modern-day architecture of Isozaki Atea and the Guggenheim Museum.

The best views of the city can be seen by taking a walk up Mount Artxanda. Bilbao is a city with various cultural, gastronomic and leisure opportunities on offer.

As mayor of Bilbao, I would like to recognise and reinvigorate those individual and local actions. In Bilbao, we have already made great progress on managing urban waste, emission control and air quality as well as energy efficiency in illumination, installations and government buildings.

We also define specific measures to encourage implementation of renewable energy sources in residential buildings and, right now, we are involved in an implementation project of intelligent networks for the distribution of electricity.

In spite of this, our greatest challenge continues is creating and capitalising on citizen awareness to keep battling for our beloved planet. It is worth the fight.

Iñaki Azkuna
Mayor of Bilbao
www.bilbao.net

Bilbao motion city
Lee Kuan Yew World City Prize Laureate 2010

CDM OPPORTUNITIES IN WASTE

Africa's contribution to the global carbon sink is less than 3% with waste constituting 30%. The City of Lagos in Nigeria is focusing its local adaptation strategies on the creative development of indigenous technology and resource utilisation.

With an ever-increasing population of over 18 million, Lagos has developed initiatives to enhance and sustain a green economy, and create opportunities for market-based solutions to combat the challenges of waste management.

Lagos Waste Management Authority (LAWMA), a governmental agency of the Lagos State Government, seeks to achieve this goal by implementing the following strategies:

- We provide planning, research, educational and technical assistance to the public, businesses and local governments.
- We initiate innovative programmes to minimise waste generation.
- We encourage economic development opportunities.
- We serve as a public policy advocate for long-term solutions to waste management challenges.
- We develop partnership models with organisations and institutions for fruitful symbiotic development and growth.

Despite the apparent robust opportunities in the Lagos waste management sector, there are limited financing opportunities for Clean Development Mechanism (CDM) projects in Africa because of inadequate capacity within the public and local finance sector.

The uncertainty of a post-2012 successor to the UN's Kyoto Protocol climate pact and its effect on the market value of Certified Emission Reductions (CER's) for countries where emission reduction would not be used as an international offset by the EU ETS also poses a threat to investment opportunities.

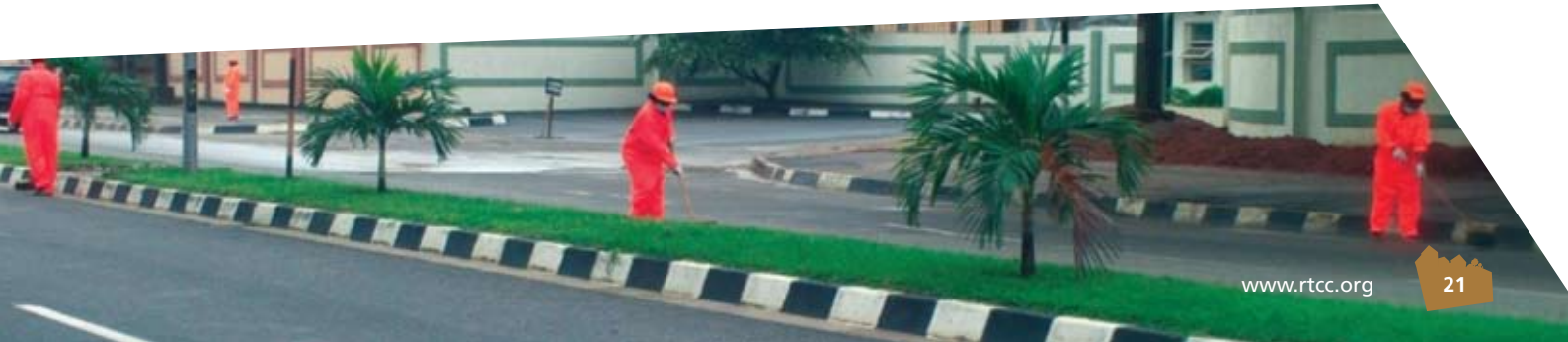
Lagos Waste Management Authority began redesigning its landfill operations to ensure an efficient and effective gas collection system where waste is converted to electricity. At the landfill site in Olusosun, collected methane gas is estimated to generate over one million units of Certified Emission Reductions (CERs) in ten years with complementary generation of 30 mega watts of electricity.

Landfill Gas collection has commenced at Olusosun with the hope of converting the LFG collected into the first line of one mega watt of electricity by December, 2011.

Lagos Waste Management Authority
www.lawma.gov.ng

CDM PROJECTS IN LAGOS

CURRENT PROJECTS	FUTURE PROJECTS
Waste collection trucks are being retrofitted or replaced with modern trucks that conform with emission standards leading to a reduction in vehicular density and emissions	Lagos Integrated Solid Management Project (LISWMP) for the development of the first eco-friendly integrated waste management facility under a public private partnership model
Plastic Buyback programme to create multiple recycling centres in collaboration with local business	Development of a gas collection and utilisation system at two landfill sites, Abule-Egba and Solous, with financial support from the United States, UNEP and Africa Carbon Asset Development (ACAD)
Construction of Transfer Loading Stations. These are processing sites with material recovery facilities to promote resource recovery, reduce vehicular emissions and improve turn around time	Management and operation of existing Transfer Loading Stations under a Public Private Partnership arrangement
Establishing a compost site in partnership with the private sector – daily it produces 250 bags of organic compost already registered and earning CERs	Construction of additional Transfer Loading Stations under a D-FBOT (Design, Finance, Build, Operate and Transfer) partnership model
Attainment of 12% waste conversion rate	



BIG SOLUTIONS FROM A SMALL ARENA

The tiny city-state of Singapore contributes less than 0.2% of world greenhouse gas (GHG) emissions. Nevertheless, this nation of under five million people is tackling climate change with aggressive policies and incentives to curb emissions and increase energy efficiency.

City Developments Limited (CDL), a leading property developer in Singapore, explains how those initiatives, combined with sustained, innovative efforts from its leading companies, have resulted in notable contributions to the global sustainability movement. One of Singapore's most ambitious policies is to have 80% of all buildings energy efficient by 2030.

ROOM FOR SAVINGS

According to the World Green Building Council, green buildings reduce energy usage by 30-50% and cut waste output by 70% and water usage by 40%. A recent report by the International Energy Agency found global carbon dioxide emissions from buildings could be reduced by up to 25% merely by increasing the use of existing technologies for efficient heating and cooling. This two gigatonne (Gt) reduction would save 710 million tonnes oil equivalent (Mtoe) of energy by 2050.

Reducing electricity consumption will help Singapore reach its carbon emissions reduction targets. The government has committed to cutting emissions by 16% below business-as-usual levels by 2020 in the event of an international treaty on carbon emissions, or 7-11% in the absence of such a treaty.

In 2009, CDL introduced 11 Tampines Concourse, the first CarbonNeutral® development in Singapore and Asia Pacific. The three-storey office building is designed to be energy and water efficient, and built with recycled components such as "green concrete" made from sustainably-sourced materials. Its operating expenses and energy use are minimised through natural daylight and an innovative air cooling system that uses no chemical refrigerants in a natural heat exchange process. The building's energy-saving features save an estimated 620,000 kilowatt hours (kWh) of electricity annually.

Carbon management company, CarbonNeutral, calculated the building's carbon footprint and purchased carbon credits to offset any remaining emissions. From its first year of operation, these amounted to 6,750 tonnes of carbon dioxide equivalent (tCO_2-e). The credits bought to offset this funded three renewable energy and resource conservation projects in China.

In 2008, CDL built 7 & 9 Tampines Grande, an office building with a rooftop solar power plant and a glass façade with built-in solar components. The project's three different solar energy systems provide 203,000kWh of solar energy. Combined with other energy efficiency features, this reduced the burden on the national grid by 2.7 million kWh each year. The technology included a solar air-conditioning system for the atrium, rooftop photovoltaic (PV) panels that doubled as shading devices for water tanks and the building's exterior, and 40 building integrated photovoltaic (BIPV) panels built into the exterior walls in place of glass panels. It is also the first completed development in Singapore to receive the LEED Gold Certification from the US Green Building Council (USGBC) under the Core & Shell category.

REWARDING WORK

CDL was recently accorded the nation's highest honour for accumulative achievements in Singapore's sustainable building arena and was the first company to earn the Green Mark Platinum Champion Award from the Building and Construction Authority (BCA) – Singapore's governing body for the built environment.

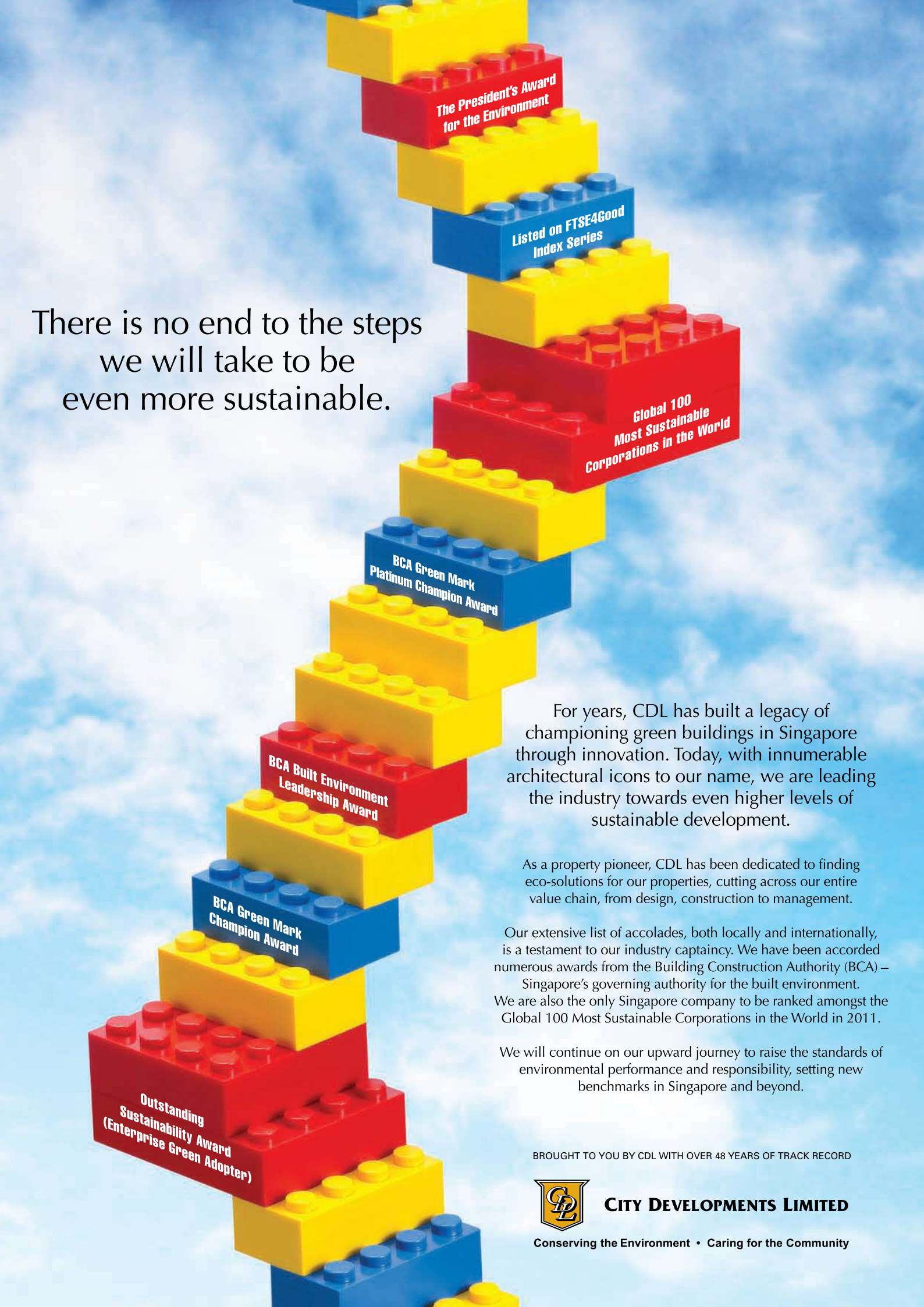
The BCA Green Mark Scheme was launched in 2005 to encourage sustainable construction practices. New and existing buildings are rated on energy and water efficiency, waste management methods, construction materials and practices, overall environmental impacts and indoor air quality. Buildings are awarded Platinum, Gold^{Plus}, Gold or Certified rating. In 2008, this scheme was made mandatory – all new buildings are required to meet basic standards. These have been continuously revised, ending in an energy efficiency mandate that is 28% over the original guidelines.

As a green advocate, CDL typically invests 2 to 5% of each project's construction costs on green design elements and state-of-the-art technology. The company has received over 50 Green Mark Awards, with 16 of them being the Green Mark Platinum tier. 94% of CDL's certified projects have been awarded Green Mark Gold status or higher.

As a result, it is now targeting a minimum Gold^{Plus} rating, upgraded from its 2010 target of attaining at least a gold level standard, for every new project, as part of its eco-commitment to Singapore's sustainability efforts.

City Developments Limited (CDL)
www.cdl.com.sg

CITY DEVELOPMENTS LIMITED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For years, CDL has built a legacy of championing green buildings in Singapore through innovation. Today, with innumerable architectural icons to our name, we are leading the industry towards even higher levels of sustainable development.
As a property pioneer, CDL has been dedicated to finding eco-solutions for our properties, cutting across our entire value chain, from design, construction to management.
Our extensive list of accolades, both locally and internationally, is a testament to our industry captaincy. We have been accorded numerous awards from the Building Construction Authority (BCA) – Singapore's governing authority for the built environment. We are also the only Singapore company to be ranked amongst the Global 100 Most Sustainable Corporations in the World in 2011.
We will continue on our upward journey to raise the standards of environmental performance and responsibility, setting new benchmarks in Singapore and beyond.
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MANY HANDS BUILD A CLEANTECH FUTURE

As the first eco-business park in Singapore, CleanTech Park supports the country's S$1 billion Sustainable Blueprint programme. When completed in 2030, CleanTech Park is expected to host 20,000 'green-collar' jobs and attract some S$2.5 billion worth of investments. The aim is to create a one-stop hub, reflecting Singapore's leadership aspirations in cleantech and sustainable solutions for the Tropics.

Its first iconic building is CleanTech One, which embodies the synergy between green and business. A cluster of ten key local and international cleantech-related organisations have committed to more than 50% of the space, hoping to boost their research activities and reap benefits from clustering numerous cleantech activities under one roof.

A CLEANTECH COMMUNE

A key tenant is the Nanyang Environment and Water Research Institute (NEWRI). This institute is at the forefront of Singapore's R&D efforts in environmental and clean water technologies, with funding to the tune of S$250 million. With seven research centres, NEWRI is a recognised world leader in new water technologies, especially in membrane applications, the most recent being the multifunctional membrane made of graphene-based nanocomposite materials, which produces high quality drinking water while generating electricity.

Danish company, DHI Environment and Water, together with NEWRI, have set up the DHI-NTU Water & Environment Research Centre & Education Hub, dedicated to the overall planning and management of water and waste, such as urban and coastal environmental management using hydraulic, hydrologic and process modelling. DHI's new Singapore head office will run consulting services including environmental impact and monitoring, habitat field surveys, and sediment and eco-toxicological laboratory testing.

Another water treatment company is Toray Industries, the world's largest producer of carbon fibre, which has partnered with NEWRI in the Toray Water Technology Laboratory (TWLT). This body researches reverse osmosis membranes for seawater desalination and reclamation of wastewater. Sinomem Technology, currently the largest membrane solution provider for industrial applications in China, has also found its place in CleanTech One. They are the first industry partner in the Singapore-Peking-Oxford Research Enterprise's (SPORE) S$63 million cleantech research programme, led by the National University of Singapore, Peking University and the University of Oxford.

ON THE SOLAR WORLD MAP

The SERIS Testing and Certification Lab is a venture with the Association for Electrical, Electronic & Information Technologies (VDE), the Fraunhofer Institute for Solar Energy Systems (ISE) and the Solar Energy Research Institute of Singapore (SERIS). Their combined expertise offers a complex range of testing and certification services for solar photovoltaic modules of all technologies, including active testing of solar modules and module components, lifetime testing and performance measurements.
Another solar entity is SOLID Asia, a world leader in the construction of large scale solar thermal plants; 10 of the 35 largest solar plants implemented since 1997 were installed by SOLID. Their reliable, state-of-the-art system achieves fast payback. Singapore's Nanyang Technological University (NTU) is partnering with SOLID Asia on research on how tropical countries like Singapore can more effectively harvest solar thermal energy. Plans are underway for a testbed system on CleanTech One to collect the data.

With a vibrant mix of green business activities congregating at CleanTech One, the Park could be the birth place of the next new eco-solution. This eco-community of companies and talents will inevitably encourage cross-fertilisation of ideas, and facilitate opportunities for collaboration and strategic alliances of the industry.

Singaporean agency, JTC Corporation, plans, promotes and develops dynamic landscape, in support of the nation's economic advancement. Since 1968, it has developed 6,600 hectares of industrial land and 4.4 million square metres of ready built facilities. In the process, JTC has housed more than 7,000 home grown companies and multinationals and has since evolved to play a catalytic role in innovative real estate solutions, such as the CleanTech Park.

JTC Corporation
www.jtc.gov.sg

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Find out more at: rtcc.org/energy

MEETING CHALLENGES WITH TECHNOLOGY

The Tokyo University of Science (TUS) explains how their work across earth observation, solar energy and energy efficiency helps governments, industries, and individuals to contribute to feasible, effective, and sustainable solutions to climate change.

TUS researchers operate a sophisticated network of mountain observation stations that measures air currents across East Asia and Japan, mixing between the planetary boundary layer and the free troposphere, and nucleation/condensation of atmospheric pollutants. As an isolated peak normally situated in the free atmosphere, Mt. Fuji is particularly suited to such measurements. This allows for better understanding of how clouds and aerosols affect the global energy equilibrium, and the crucial roles they play in mediating solar radiation.

HARNESSING SOLAR ENERGY

The university is developing a cutting-edge artificial photosynthetic system to convert solar radiation into usable electricity and fuels. The system uses a highly efficient dye-sensitised solar cell submodule to capture solar radiation, and new, greener lithium- and sodium-based batteries to store it as electricity, which can then be used to produce hydrogen via water electrolysis. In addition, a special team headed by TUS president, Akira Fujishima, is conducting breakthrough studies on producing hydrogen and other clean fuels from water and carbon dioxide through a process known as photocatalytic water splitting, based on the Honda-Fujishima effect, which he co-discovered in 1972. This research will help transform the energy industry, directly impacting environmental effects associated with climate change.

TUS is leading the development of new photovoltaics, such as the Cu-In-Ga-Se solar cell and the Mg_2Si solar thermoelectric cell, as well as next-generation fuel cells. They are working to integrate these new materials and devices with urban planning and demographic studies to maximise leverage of renewable energy sources and facilitate the implementation of new technologies. This research envisions a low-carbon society powered by more distributed, highly interconnected sources of electricity supported by solar batteries.

Other university scientists are looking at ways to integrate building-specific energy management systems and fuel-efficient vehicles (electric, plug-in hybrid, and fuel cell hybrid) with information networks to reduce power consumption and improve efficiency. They are also developing advanced energy distribution systems with higher power conversion efficiency and lower electromagnetic interference to improve the interaction of these systems with power grids.

Maximising energy efficiency is one of the key elements of any long-term global warming mitigation strategy, and has also taken on added importance in the wake of the recent Tohoku disaster in Japan.

Tokyo University of Science
www.tus.ac.jp

Established in 1881 by 21 young researchers, the Tokyo University of Science (TUS) is the largest private technical university in Japan, home to over 700 faculty and 20,000 students, filling 13 undergraduate and 11 graduate schools on four campuses. Its coordinated programme within the Research Institute for Science and Technology comprehensively targets climate change at multiple levels, from the tiniest nanoscale phenomena to far-reaching technological and societal issues.

The four core research objectives of TUS climate research are:

- Understanding the global energy balance
- Harnessing solar energy
- Pioneering greener tech and social systems
- Improving energy distribution

TOKYO UNIVERSITY OF SCIENCE

Some of the Sugi trees in the rainforest on Yakushima Island, a UNESCO World Heritage Site, are over 2,000 years old. They are battered by fierce winds and rains that can exceed 890 mm per day. When one of them falls over, the gap in the canopy lets in sunlight so that new trees may sprout. This cycle has continued uninterrupted for millions of years.

Science has a responsibility to the future of the earth. As a university with over one hundred years of scientific excellence, we are committed to finding sustainable solutions to the challenges of this century, and to exploring what science together with **CONSCIENCE** can do for the next.

東京理科大学 TOKYO UNIVERSITY OF SCIENCE

http://www.tus.ac.jp/

WHAT GREEN REALLY MEANS – A SOLAR COMPANY PERSPECTIVE

A shift in environmental policies worldwide is strengthening the demand for renewable energy technology providers to rethink their everyday operations and create a truly sustainable solution to meet rising energy demands. There is little doubt regarding the potential of renewable energy to tackle many of the world's energy challenges.

As a manufacturer of solar modules, Upsolar is especially aware of its environmental impact. Rather than just creating a product for renewable energy generation, technology manufacturers can contribute to the health of the environment in a variety of ways. This could happen by looking at a product's life cycle: how it is produced, how it performs, and the procedures for disposal at the end of its life.

FROM CRADLE TO GRAVE

In an effort to optimise its production, Upsolar is taking stock of its overall impact through a comprehensive life cycle assessment (LCA). Driven by precise guidelines from regulators in Europe and North America, the LCA process evaluates the environmental implications of products and processes from cradle to grave.

The results will consider its annual energy use, material consumption and product recyclability. By analysing environmental impacts of products, the company can establish a baseline from which to improve. Analyses on energy payback time are also planned, in addition to global warming potential. This could one day be commonplace for operation in the European Union and North American markets.

Solar cell efficiencies have steadily increased over recent years and Upsolar has focused on continuous innovation at the module and system levels. Through strategic partnerships, the company is one of the first providers to offer truly "smart modules," which incorporate integrated mounting solutions and electronics-based technologies to enhance both system performance and aesthetics. Having the right innovations in the pipeline means customers have a faster return on investment, while solar PV moves closer to grid parity with increased feasibility and reliability of renewable energy.

Manufacturers can also support responsible recycling of solar modules – and indeed, many have. Upsolar is a member of PV Cycle, an organisation that provides take-back and recycling services for PV modules. PV Cycle covers more than 90% of the European PV market; their customers are able to dispose of modules at over 100 collection points. Through these voluntary, collaborative efforts, a more sustainable production cycle is achieved.

Upsolar is a leading international solar module developer and producer, offering the solar industry's best quality / price ratio in the global PV market. With vertically integrated, diversified manufacturing platforms, as well as an R&D supported quality control management system, Upsolar produces high quality, reliable solar modules backed by a world-class warranty, at competitive prices. Headquartered in Shanghai, Upsolar has offices throughout Asia, Europe and North America to support an international customer-base, providing on-site technical support, customer service and product development teams.

VALUE-DRIVEN SUSTAINABILITY

This innovative, progressive spirit is mirrored in Upsolar's sustainability values. A renewable energy technology manufacturer can consider itself "green" simply because it produces a renewable energy product, or it can take the proper measures to incorporate environmentally friendly practices at each phase of a product's lifetime.

There is a lot of room for companies to contribute to the fight against climate change and do more to properly gauge their carbon footprints. As a manufacturer, Upsolar has the responsibility to find the intersection of sustainability and prosperity and strives to meet this challenge with the hope that others will consider their manufacturing and operational impacts as well. By staying abreast of the concerns of the global community and keeping informed about policy transitions, Upsolar is ensuring they are always at the forefront of providing dependable, sustainable solar at a low cost – not just for customers, but ultimately for the environment.

Upsolar
www.upsolar.com

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Quality, reliability, and innovation. Upsolar's experience is available throughout the value chain, from product development through to launch. When you choose Upsolar, you can be certain that you are buying and offering a top of the line photovoltaics module, made of high quality sustainable materials.
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BIOFUELS FROM MICROALGAE – GROWTH SPURT ON THE WAY

Biofuels themselves emit fewer greenhouse gases than fossil fuels. But because biofuels are processed mainly with crops such as canola, rye, wheat, and sweet corn, sceptics argue that their ecobalance is bad in terms of the destruction of farmland and biodiversity loss. Additionally, critics warn that support for food aid programmes will run dry if excess food is used increasingly as fuel.

Researchers at Bielefeld University's Centre for Biotechnology (CeBiTec) are developing a technology that unites an ethically acceptable generation of bioenergy with profitability – the production of biofuels from microalgae.

PONDLIFE POTENTIAL

Microalgae are produced in bioreactors or open ponds. They are unicellular, plant-like organisms that carry out photosynthesis and transform carbon dioxide (CO_2) into biomass. From this biomass, energy carriers like biodiesel, biomethane, or hydrogen can be derived. Worldwide research on microalgae as a source for bioenergy is still in its infancy – an efficient and profitable bioenergy production with microalgae has yet to be established.

Most of the university research is being performed in the Strategic Research Area, Molecular and Nano Sciences, headed by Professor Dr. Olaf Kruse, and in partnership with a local energy supplier and the SOLARBIOFUELS consortium at Queensland University in Australia. Professor Kruse regards microalgae as excellent candidates for complementing or even replacing traditional energy crops as a source for biomass production and conversion into biofuels.

A core theme of study is looking at modern genetic engineering methods to develop algae highly efficient at converting carbon dioxide directly into carbon-based fuels. One of Professor Kruse's plans is to optimise the lipid and sugar levels inside the cells: "This would mean a higher return of carbon-based biofuels," he says.

The team aims to identify new microalgae variants characterised by improved sun-to-bioenergy conversion efficiencies and develop cheap and efficient production systems. They are examining the bottlenecks in converting sunlight into biofuels like hydrogen, methane, and diesel.

DEALING WITH THE UNDESIRABLES

Although biofuels have the advantage of being produced from renewable resources, their combustion can produce increased levels of carbonyl compounds such as acetaldehyde and formaldehyde, known to be poisonous and possibly carcinogenic. And far more is known about pollutants from fossil fuel combustion.

The research group "Algae Biotechnology & Bioenergy" are working on identifying new microalgae variants

Since its foundation in 1969, Bielefeld University has been guided by the paradigm of interdisciplinarity, because today's complex problems can no longer be tackled adequately through monodisciplinary approaches alone. Here, interdisciplinarity stands for a spectrum of approaches of different kinds and intensities.

As the architectural expression of its interdisciplinarity, the University unites – uniquely in Germany – almost all its departments in one single building. It houses 13 faculties covering a broad spectrum of disciplines across humanities, natural sciences, social sciences and technology.

A team in the Faculty of Chemistry is analysing the combustion chemistry of fuels and studying methods to achieve lower emissions. Professor Dr. Katharina Kohse-Höinghaus, head of the Physical Chemistry I group, is focusing on low-temperature combustion as an alternative to current techniques. "A low combustion temperature reduces nitrogen oxide and soot emissions at the same time," she says. Her group is investigating low-temperature combustion in a Collaborative Research Centre with RWTH Aachen University. Kohse-Höinghaus and her colleagues wish to combine new motor control systems with intelligently selected biofuels. The chemist sees useful ties with the work on algae biotechnology in Bielefeld that might well lead to the production of the fuel of the future.

Bielefeld University
www.uni-bielefeld.de
www.uni-bielefeld.de/personen/kruse
www.uni-bielefeld.de/personen/kohse

Universität Bielefeld

CATCH 22 – ENERGY ACCESS OR SECURITY IN WEST AFRICA

The energy system of West Africa is facing the interrelated challenges of energy access, energy security and climate change mitigation and adaptation simultaneously.

The region, with around 300 million inhabitants equivalent to roughly one third of Africa's total population, has one of the lowest modern energy consumption rates in the world. Household access to electricity across the region is about 20% but wide gaps exist between the access rates in urban areas that average at 40% and in rural areas at 6% to 8%.

The electricity systems in West Africa are facing tremendous challenges due to the growing gap between predicted demand, existing supply capacities and limited capital to invest.

With climate change another concern was added to the heavy energy agenda of West African countries. West Africa is so far only responsible for a fraction of global energy related GHG emissions. However, the energy sector will be highly impacted by mitigation and adaptation costs of climate change in the forthcoming decades.

Renewable energy and energy efficiency are appropriate tools to address these challenges simultaneously and in a sustainable manner. Apart from significant fossil fuel resources, West Africa can rely on a wide range of untapped renewable energy and energy efficiency potentials in various sectors. However, so far the West African markets remain largely underdeveloped. They do not take advantage of their potential due to various technical, financial, economic, legal, institutional, policy and capacity related barriers.

POLICY RESPONSE

The Economic Community for West African States (ECOWAS), representing fifteen West African countries, has taken a pioneering role in the promotion of renewable energy and energy efficiency through a regional approach. As a policy response to the challenges, the ECOWAS Energy Ministers established the first regional renewable energy promotion agency of Sub Sahara Africa. In July 2010 the ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE) was inaugurated with support of the ECOWAS Commission, the Austrian Development Cooperation (ADC), the Spanish Agency for International Development Cooperation (AECID), the United Nations Industrial Development Organization (UNIDO) and the Government of Cape Verde. The Secretariat of the Centre is based in the city of Praia in Cape Verde.

The Economic Community for West African States (ECOWAS)
www.ecreee.org

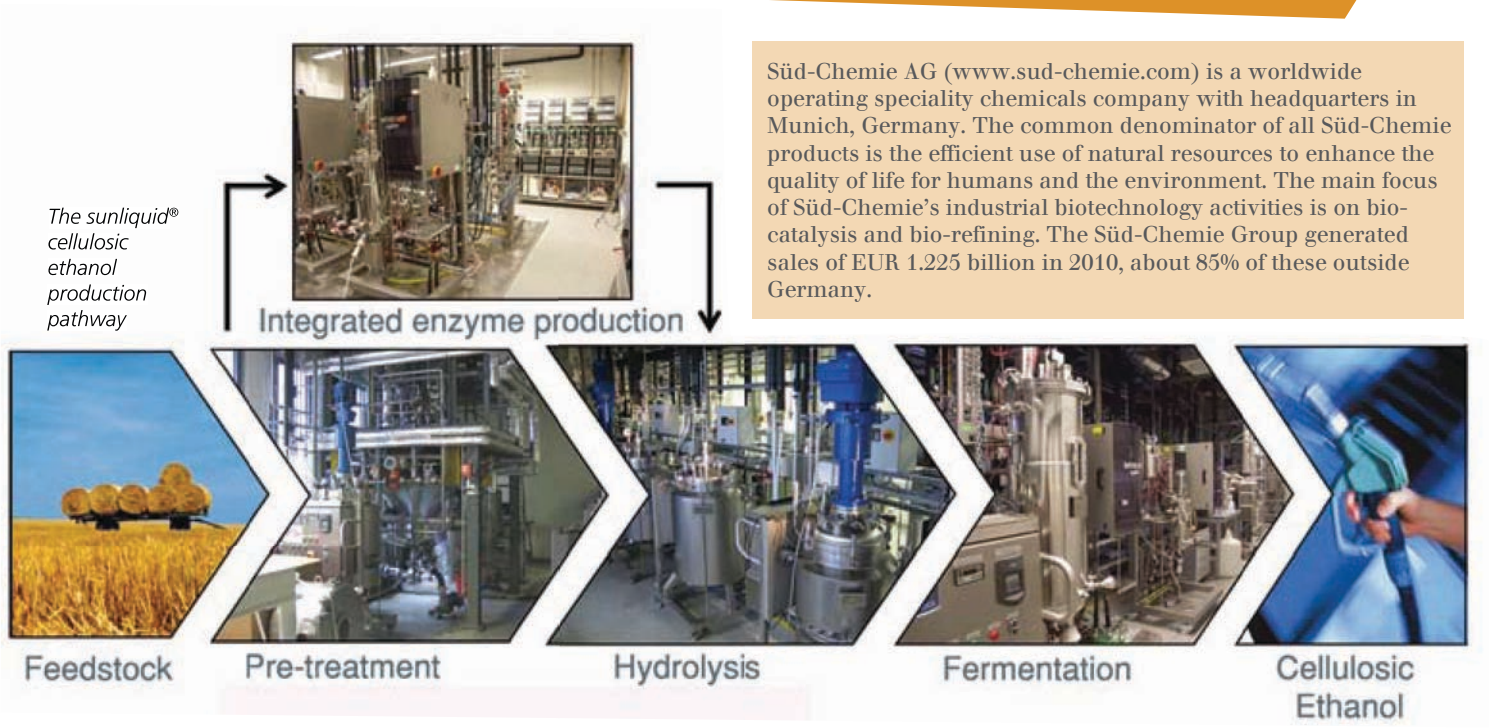
The ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE) is a specialised Agency of the Economic Community of West African States (ECOWAS). In 2008 the 61st Session of ECOWAS Council of Ministers adopted the regulation C/REG.23/11/08 and gave ECREEE a legal basis. The objective of the Centre is to create favourable framework conditions for renewable energy and energy efficiency markets by supporting activities directed to mitigate existing barriers. The Centre implements projects in the following priority areas:

- Fund mobilisation and project management.
- Tailored policy, legal and regulatory frameworks and quality standards.
- Capacity development and training.
- Advocacy, awareness raising, knowledge management and networking.
- Business and investment promotion.

The centre offers the following services to its partners and clients:

- A coherent RE&EE policy and strategy framework for the ECOWAS region.
- Coordinates, develops and executes regional key programmes and projects.
- Operates as key entry point for the implementation of international funding to mitigate climate change in the energy sector.
- Provides co-funding for demand-driven projects and initiatives.
- Think-tank, lobbying agent, knowledge and advisory platform.
- Networking agent and organisation of conferences, forums and workshops.
- Facilitator for north-south and south-south cooperation.

THE LIQUID STRENGTHS OF CELLULOSIC ETHANOL



The sunliquid® cellulosic ethanol production pathway

Süd-Chemie AG (www.sud-chemie.com) is a worldwide operating speciality chemicals company with headquarters in Munich, Germany. The common denominator of all Süd-Chemie products is the efficient use of natural resources to enhance the quality of life for humans and the environment. The main focus of Süd-Chemie's industrial biotechnology activities is on bio-catalysis and bio-refining. The Süd-Chemie Group generated sales of EUR 1.225 billion in 2010, about 85% of these outside Germany.

As the transport sector is one of the main contributors to greenhouse gas emissions, biofuels constitute the primary route to more sustainable mobility. With crude oil prices around US$100 a barrel, biofuels are an important source of energy – not just for mitigating climate change, but also in reducing our dependence on fossil resources.

Worldwide, bioethanol is the most important biofuel with production volumes of 85.8 billion litres in 2010. Today it is made mainly from wheat, corn or sugar cane. In contrast, cellulosic ethanol uses lignocellulosic material such as agricultural residues like crop straw or corn stover as a feedstock, reaching highest greenhouse gas savings. Furthermore the use of residues prevents a food-versus-fuel competition. Thus, cellulosic ethanol provides a new energy source based on an already available renewable feedstock without needing any additional land or production capacity.

ON THE WAY TO COMMERCIALISATION

Over recent years the technology for the production of cellulosic ethanol has matured substantially. A handful of different processes are being developed, such as the sunliquid® process by Süd-Chemie.

The sunliquid® technology converts the cellulose and hemicelluloses fraction of the feedstock into a sugar solution using highly optimised feedstock and process specific biocatalysts. Those biocatalysts are produced process integrated, thus substantially reducing overall production costs. A proprietary fermentation organism converts C5 and C6 sugars simultaneously into ethanol in a one-pot-reaction resulting in 50% higher yield compared to C6 fermentation only. The residual lignin fraction is used for combustion. Together with a new ethanol separation technology that saves 50% of energy demand in this usually energy intense step, the whole process is energy self-sufficient, yielding bio-ethanol with greenhouse gas savings of up to 95% compared to gasoline.

The technical feasibility of the process will be proven in a demonstration facility currently under construction in Straubing, Germany. From the end of this year, the plant will produce up to 1,000 tons of ethanol from about 4,000 tons of wheat straw.

POTENTIAL BACKED BY POLITICS

The demand for cellulosic ethanol is highly probable to increase in all developed countries and emerging markets over the upcoming years. The developments in legislation and industry are predicted to support the growth of the cellulosic ethanol market.

The worldwide potential of biomass is huge. In the United States, annual production of agricultural residues (cereal straw and corn stover) reached almost 384 million tons in 2009 and Brazil alone produced more than 670 million tons of sugar cane in 2009 yielding more than 100 million tons of bagasse (dry basis). In the European Union, almost 300 million tons of crop straw are produced annually.

To translate this potential into real-life achievements, political action needs to be taken to create a stable environment for investors. Support for the set up of first-of-its-kind plants is essential to bridge the gap in investment costs between first and later plants and to overcome the so-called "Valley of Death" between research and deployment. The technology is ready and available now – and it is only one step more to make the advantages associated with cellulosic ethanol available on a broad basis bringing more sustainability to transport.

Süd-Chemie
www.sud-chemie.com

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CREATING PERFORMANCE TECHNOLOGY

As a worldwide leading company in catalysts and adsorbents technologies, we also provide innovative technologies and processes for the production of next generation biofuels and bio-based chemicals. Süd-Chemie offers innovative system solutions including catalysis, biocatalysis, down stream processing and process technology out of one hand.

The sunliquid® process for the production of cellulosic bioethanol from straw and other lignocellulosic residues is one of our contributions to climate friendly solutions in CleanTech – energy efficient, environmentally friendly, resource efficient and no competition to food or feed.

Süd-Chemie stands for innovation and tradition – for more than 150 years

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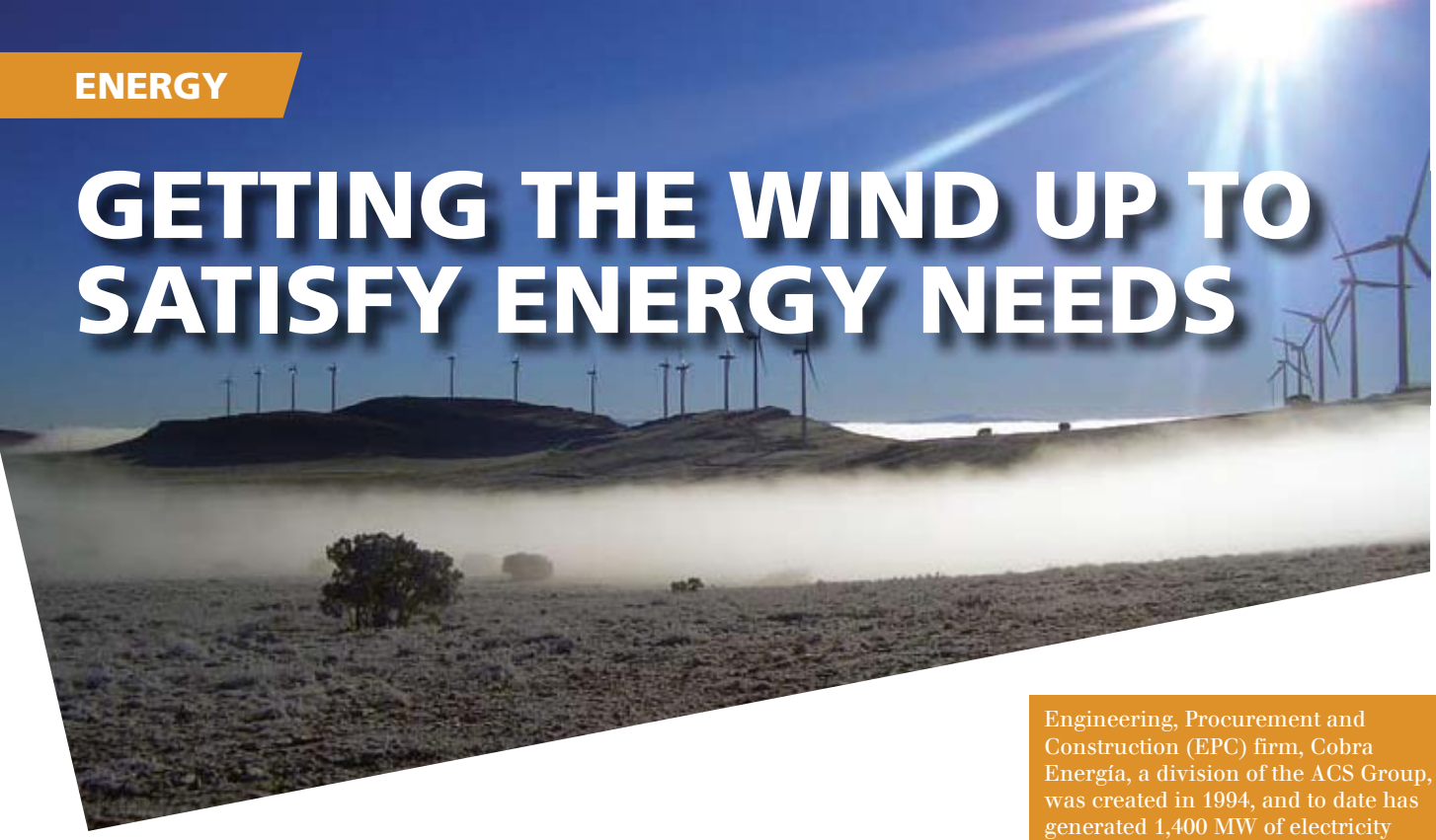
GETTING THE WIND UP TO SATISFY ENERGY NEEDS



Wind power is the least expensive of all other forms of alternative energy, with costs set to decline further as technology improves. Once the turbines are in place, maintenance is low and the wind is free. With zero carbon dioxide emissions, wind energy does not deplete the world's natural resources.

The potential in wind power is largely untapped as less than 1% of the world's energy is derived from wind power. Spanish energy company, Cobra Energía, details the building blocks to establishing a successful wind farm.

In order to maximise a facility's performance, they rely on suitability and geography – not trend or best-fit solutions. From the 3MW installed at the *Monte das Aguas* wind farm in Spain, to the Oaxaca 100MW wind farm in Mexico, consideration is paid to what will generate the most value for clients in terms of longevity reliability, conforming to any given jurisdiction's environmental/corporate responsibility, requirements and competitively targeting overall cost.

A wind farm project includes the following phases:

1. Development: wind farm design (site evaluation, wind studies, project feasibility studies), land acquisition (property ownership assessment, land easement and right of access), licensing (administrative approvals, environmental permits and construction licenses) and other processes (feasibility studies, local stakeholders analysis and grid interconnection).
2. Construction: detailed engineering (layout, electrical infrastructures and civil works), procurement and constructing.
3. Project management: Integrated project control and coordination, contractor management, work supervision and control, stakeholder management, schedule, cost, scope and quality control and commissioning and hand-over.

Engineering, Procurement and Construction (EPC) firm, Cobra Energía, a division of the ACS Group, was created in 1994, and to date has generated 1,400 MW of electricity from the over 50 wind farms it has created worldwide. Since then, it has diversified into solar thermal power plants and biomass, becoming pioneers in dispatchable clean energy and revolutionising the energy industry.

The company's Corporate Responsibility activities are summarised in three commitments that the company adopts voluntary and responsibly: to the social environment, to the natural environment and to technological development.

Decades spent cautiously and conservatively diversifying business activities and adapting to market demands has meant that Cobra Energía remains firmly focused on delivering its wide range of capabilities to its ever-growing client base for the foreseeable future. With a commitment to progress through a continuous effort in the fields of technological innovation, understanding management needs of its customers, and through pursuit of its own investments in new techniques and new assets, the company now intends to move into other renewable energy solutions, such as offshore wind farms, in the years to come.

Cobra Energía
www.grupocobra.com

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Bringing progress:

developing, building and

operating renewable energy facilities.

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GATHER THE SUNRAYS WHILE YOU MAY

We are all familiar with the term renewable energy. However, if we analyse the term, it is a misnomer – energy cannot be renewed, only converted into a different form. The major primary source of our energy, originates from the sun's historical performance.

Our planet has captured and stored this energy in many different forms. We have plundered this bank of energy for the duration of mankind's existence. From the caveman's wood burning fire, to the fossil-fuelled electricity generators, we have generated chemical pollutants and heat inadvertently. Our problem arises in that we are releasing these elements too rapidly. A millennia of captured energy is being released in decades.

The renewable energy process in any of its forms, wind, hydro, wave or solar, is utilising the sun's most recent energy as well as releasing some of the "captured" energy at a colossally reduced rate compared to traditional methods. Perhaps renewable energy should be called cleaner energy.

Solar company, CNPV Solar Power SA, delves into the problems behind renewable energy and explains how their technological progress is addressing many of these issues. Their products are able to harvest more, with higher efficiencies, for a longer period of time. This quality advantage carries with it greater financial security from independent market protecting insurance.

SOWING FOR BENEFITS

It would be naïve to try and ignore the problems that need to be overcome to fully reap the benefits possible. Comparable costs to traditional methods are still higher across solar power generation. The sun only shines on one half of the planet at any given time, so we need an effective instantaneous storage solution. The amount of energy falling onto the collector is not fully harvested, leading to higher costs. The localised heating wherever a photovoltaic module is positioned needs an effective cooling method and high solar insolation regions tend to be scarcely populated areas requiring effective energy transmission systems.

The main stumbling block is financial restraints, not technical issues. The solar industry has rapidly developed in recent years. Even this rapid growth, however, is not quick enough. Costs will drive change, to some extent. Grid parity will bring a renewed focus and additional viability to the solar industry. But how long would it take to convert from traditional power consumption on a worldwide basis?

Currently clean energy is responsible for 130,000 terra watt/hours of power, but we need to add 12 zeros to this. If all else remained unchanged, with growth driven only by financial considerations, it will take 400 years to make the transition. If we leave this to the market, we have a problem.

While we sit here and prevaricate, 89PW of energy is sent to us for free every day and we choose to ignore it. 4,000 years of energy passing us every 24 hours. For its part, CNPV is determined to harvest more of this.

CNPV Solar Power SA
www.cnpv-power.com

CNPV POWER

CNPV SOLAR POWER SA

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ADDRESSING THE ENERGY CHALLENGE – EVERYWHERE

Over the coming decades, the world will face increasing challenges to supply energy in sufficient quantities, while reducing carbon emission levels. In a business-as-usual scenario the projected world primary energy demand will double between now and 2050 (source: IEA). Electricity demand will triple in the same time-frame. Contrary to what some believe, those challenges can and need to be addressed by every country and industry.

To comply with carbon emission reduction targets (concentration of CO2 in the atmosphere must remain below 450 parts per million to limit temperature rise by 2 degrees Celsius). We need to significantly improve the efficiency of how we generate and consume energy – in short; we need to completely redesign the energy chain.

Real energy efficiency is the result of a systems approach that goes beyond individual technologies and devices. Choosing the right technologies and applying them smarter can not only help satisfy the growing energy needs of developed and developing nations, but also bring energy to the millions of energy poor.

In many cases this means using electric energy to drive motors and machinery, instead of combustion. Electric energy is highly efficient at the point of use and can be generated carbon free, even off grid. In many rural areas of the world, the power of the sun, wind and water provide viable alternatives to the burning of fuel.

In conclusion: to make energy efficiency the new energy source, we need to ensure not only that the right regulations and international cooperation are in place, but also that technology based climate change initiatives have a solid technical foundation and are built on international standards that include metrics that are valid across borders, enabling the most efficient technologies worldwide.

Founded in 1906 and headquartered in Geneva, the IEC (International Electrotechnical Commission) is a not-for-profit organisation that brings together 163 countries around the world and provides a platform for close to 10,000 experts. It delivers the solid technical foundation for all energy efficiency projects globally.

The IEC is one of three global sister organizations (IEC, ISO, ITU) that develop International Standards for the world. All IEC International Standards are fully consensus-based and represent the needs of key stakeholders of every nation participating in IEC work. Every member country, no matter how large or small, has one vote and a say in what goes into an IEC International Standard.

Reducing stand-by energy, increasing the share of renewable energy, building Smart Grids, electric cars and their infrastructure: thousands of engineers work together with us to make life better for us all.

International Electrotechnical Commission
www.iec.ch

Providing the solid technical foundation
to tackle the energy challenge.

www.iec.ch

IEC

Making
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Finance: Putting a price on climate change.

Investors crave stability. Developing a strong financial framework is a major opportunity for governments and companies promoting low-carbon technology. Only with financial certainty can the green economy reach a new level. Here at RTCC we'll be with you every step of the journey.

Find out more at: rtcc.org/business

RTCC
Responding to climate change

Rio +20
United Nations Conference on Sustainable Development

Play your part in shaping tomorrow's world at Rio+20 from June 4-6 2012. Two decades on from the inaugural Earth Summit, Rio+20 could determine the world's path towards a green economy.

The Rio Conventions Pavilion will showcase the best in adaptation and mitigation technologies, as well as facilitating knowledge exchange among the businesses attending.

If you would like to be involved or demonstrate your company's commitment to sustainability on the RioPlus business website, contact **Paul Cooper** at Entico.

Email: paul@entico.com
Call: + 44 20 7799 2222

Entico

REDEFINING BUSINESS AND WELFARE IN AFRICA

In a world where financial stability is increasingly hard to find, fleeting and ultimately critical, South African born company, Net1, explains how payment systems build capacity in the poorest areas and more importantly improve people's lives.

African payment systems are often inefficient; an international fund transfer via electronic networks can take two weeks to arrive in some African countries because of their geography. 40% of Africa's nations are island or landlocked economies – and a cheque can take over a month to clear in sub-Saharan Africa.

Most African economies are cash-based, meaning payment systems are costly and not fit for any specific purpose. Payment is not always guaranteed because of potential counterfeits and the predominance of the lack of financial discipline when paper-based payments are used. Payments systems can be small, fragmented and lack competition, adding to inefficiencies, high payments costs and exorbitant bank charges. This compromises the ability of African enterprises, especially small businesses, to trade efficiently, while many must make informal arrangements to conclude financial transactions.

For many developing economies, assistance programmes rely on cash, but in addition to the difficulties associated with this form of payment, corruption is an even bigger problem since there is no clear audit trail relating to the correct payment being made to the correct person. A secure electronic system for the distribution of food, medicine and welfare benefits would ensure the fair and reliable implementation of government policy or deployment of foreign aid.

Net1, is the leading provider of secure and affordable transaction channels between formal business and un-banked and under-banked individuals – those who have no or only limited access to financial services.

The company, established in 1989, was incorporated in Florida in May 1997. Headquartered in Rosebank, Johannesburg, it has over 2,000 employees. It operates in South Africa, across the African continent, the Middle East such as in Iraq, Russia and other CIS member states, as well as Korea, Columbia, Mexico, and the United States of America.

TRAILBLAZING THE WAY

Net1 have developed a solution, the FTS (funds transfer system), that uses the most advanced and secure smart card technology as opposed to traditional magnetic stripe or bar-coded non-micro-controller based cards. Electronic funds and data are transferred offline, securely between two smart cards for offline real-time transaction processing, or online between a smart card and a security module connected to the system's back-end where required.

Its first financial application, the UEPS technology (universal electronic payment system) supports multi-applications and wallets for both financial and non-financial (from transportation to stock taking) purposes. It can also be used as an identity card. With its online and offline real-time processing, offline biometric fingerprint verification and state-of-the-art security, the system is well suited to e-government processes.

People do not have to give their personal data to multiple organisations; government agencies can better deliver welfare benefits without a need for increased taxation; and a full audit trail facility helps combat corruption. Additionally, the smart cards can deliver financial services, including insurance and burial cover products, which allow regulatory bodies to protect individuals that are unable to protect themselves.

By providing inventory management in the distribution of medical benefits, the system can lead to improved patient treatment. An artificial intelligence program installed on the smart cards of HIV/AIDS patients in South Africa can be used to fine tune patient prescriptions using the data entered by approved medical workers.

The Net1 system facilitates the regulation of societies where cash is currently being exchanged in the streets but unmonitored by traditional systems. It enables governments to move towards a uniform national registration and identification system, allowing all government stakeholders to integrate with and have access to vital information about their population, such as:

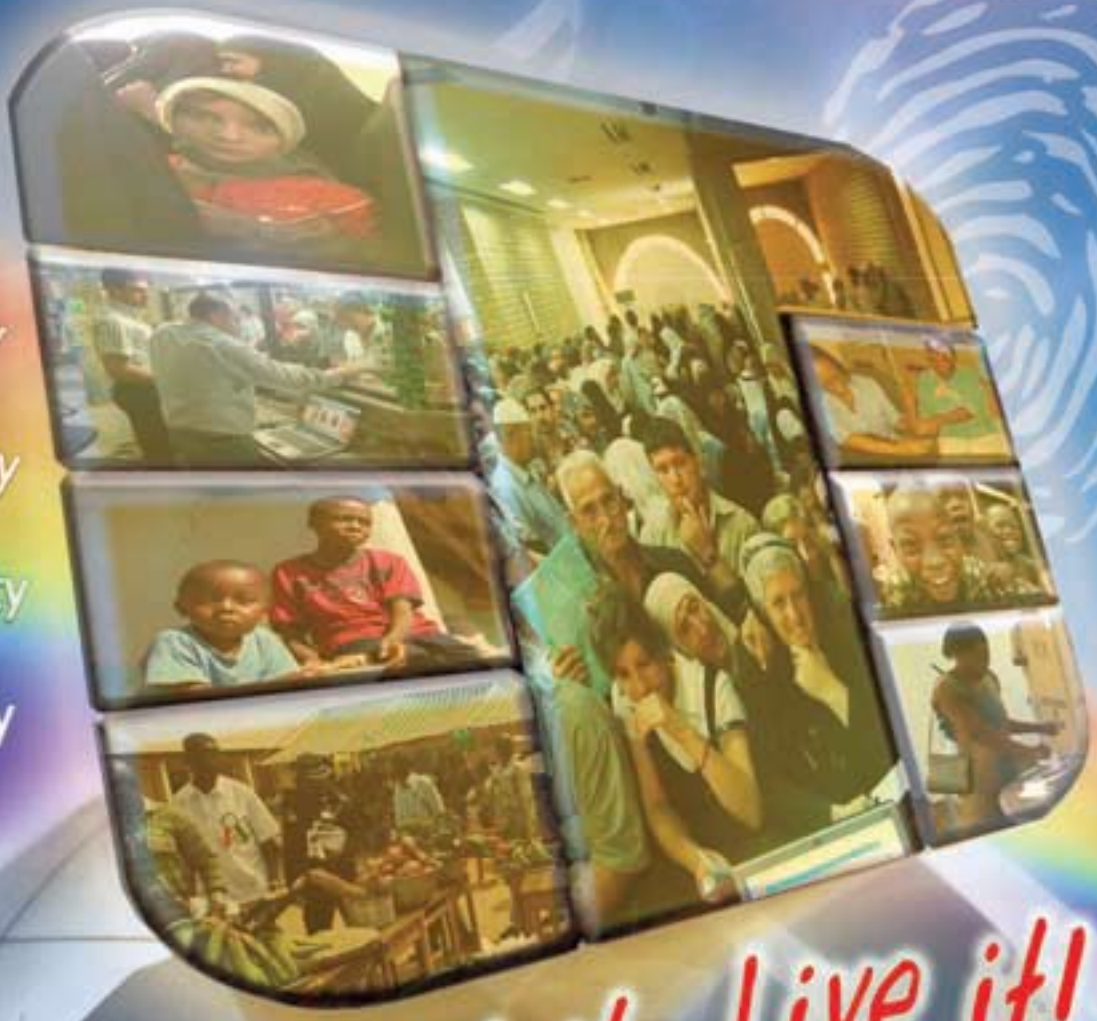
- An overarching identity system where people are issued with a card capturing their personal, fingerprints, voice and facial biometric data. Used for government and private sector operations such as banking, voting, vehicle licensing and secure transfer of ownership, it eliminates the need for a country to invest in multiple systems.
- Daily statistics on different groups living in the country at any point in time (citizens, non-residents, refugees, asylum seekers).
- The skills and strengths of the population, enabling governments to tap into or encourage further education rather than outsource the work abroad at huge costs.
- A secure voting system.

The Net1 system can help to reduce unnecessary costs, create opportunities, ignite job creation and increase prosperity across a nation.

Net1
www.net1.com

NET1 Net1 Universal Electronic Technological Solutions (Pty) Ltd. www.net1uets.com

Life Changing Technology



Simplicity

Accessibility

Affordability

Security

See it. Feel it. Live it!

BANKING FOR CLIMATE CHANGE

The stress of climate change on the societies and environment of the ECOWAS countries poses significant challenges. From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, impacts are global in scope and unprecedented in scale. Without drastic action today, adapting to these impacts in the future will be difficult and costly. EBID, the ECOWAS Bank for Investment and Development, is focusing on projects that combat both climate change and promote a green economy.

This includes working to improve understanding of climate change science and raise awareness of its impacts with decision-makers and other target audiences. In partnership with other institutions, EBID has organised several climate change workshops.

The bank supports countries in making sound policy, technology and investment choices that lead to greenhouse gas emission reductions, with a focus on scaling up clean, renewable energy sources, energy efficiency and energy conservation.

The EBID-funded Solar Street Light Project in Sierra Leone has increased access to energy in off-grid areas. This diversification of energy goes someway to ensuring security of supply, enhancing traffic safety and improving the night-life and urban economic activities.

The global REDD scheme accesses the value for carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. REDD+ goes beyond that to include the role of conservation, sustainable forest management and enhancement of forest carbon stocks.

TAPPING INTO MARKET FORCES

In recognition of this, EBID fully supported the first African Forestry Carbon Market launched in Lome, Togo, in September 2009. This promoted community-based forest management as an adaptation strategy in Africa. Up to now, there has not been a mechanism for fair sharing of the costs and benefits of eco-services. The fact that carbon now has a market value means that, for the first time, there is an instrument available to pay those who provide the eco-service.

A project to sort and compost municipal solid waste in Accra, Ghana, is improving waste management issues in the area. The waste is recycled into saleable compost for agricultural, horticultural and landscaping activities. Typically, the very high organic content (65%) of the waste combined with the high-moisture level causes anaerobic fermentation which results in harmful methane emissions. By substantially reducing the amount of waste being landfilled, the project will cut a yearly average of 58,112 tCO2eq.

The ECOWAS Commission and the ECOWAS Bank for Investment and Development are the two institutions that implement the policies, pursue programmes and carry out development projects in the member states of ECOWAS, the Economic Community of West African States.

Founded in 1975, ECOWAS is a group of 15 countries. Its mission is to promote economic integration in industry, transport, telecommunications, energy, agriculture, Natural resources, commerce, monetary and financial questions, social and cultural matters.

Its members occupy a surface area of 1.5 million km^2, representing 17% of the total surface area of the continent. The countries with the largest land mass are Niger (24.8%) and Mali (24.3%) whilst the country with the smallest is Cabo Verde (0.1%).

EBID also helps countries reduce their vulnerability and rebuild their natural resilience. One example is the financing of the Hydraform project in Benin. This cost-effective way of using fluid to shape malleable metals into lightweight, structurally stiff and strong pieces will enable Benin to protect its marine beaches from coastal erosion and supply sources of sand for concrete construction.

Climate change is a serious risk to poverty reduction and could undo decades of development efforts. Its negative impacts are most severely felt by poor people and poor countries. They are more vulnerable because of their high dependence on natural resources and limited capacity to cope. Restoring and maintaining key ecosystems can help communities in their adaptation efforts and support livelihoods that depend upon the services of these ecosystems.

ECOWAS Bank for Investment and Development (EBID)
www.bidc-ebid.org

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The ECOWAS bank

Project financing

Technical assistance

Management of Special Funds

We contribute to economic development in West Africa by financing ECOWAS and NEPAD public and private sector projects relating to transport, energy, telecommunications, industry, poverty alleviation, the environment, natural resources, protection of the ecosystem, promotion of renewable energies, clean development projects (CDM), climate change adaptation projects, projects relating to the reduction of emissions from deforestation and forest degradation (REDD).

www.bidc-ebid.org

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Biodiversity: Respect for Mother Earth.

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RTCC
Responding to climate change

FINDING SOLUTIONS – WE'VE GOT THE FOGGIEST

In Xhosa, the word for "fog" is inkungu. Local residents of Cabazane in the Eastern Cape never thought the thick, white blanket of clouds which frequently envelop the mountains held answers to their well-documented water shortage.

March 2010 saw the launch of a fog water harvesting project by Unisa's College of Agriculture and Environmental Science with the Alfred Nzo District Municipality. The resulting water quality is very high and conforms to World Health Organisation and South African Water standards for potable water.

Local resident, Thobeka Siphuthuma, 35, explained that she has been used to walking kilometres to fetch water from the local streams. While her husband was at work, she would have to juggle all the household chores, ensure there was enough firewood to prepare food for the evening and water for cooking, drinking and bathing her two children every morning.

"From here, the stream we usually go to is about two kilometres. To get there it is a bit easy because we go downhill but it is very difficult to come up the steep slope to my house with a bucket on my head. It has always been very tiring because I had to fetch water every day while my kids are off to school and come back to make something ready for them to eat after school," she explained. She said the fog water harvesting project has relieved her of a laborious daily task. "I am glad that I don't stay far away from the tanks of the fog water harvest project. I can easily access water anytime," she said.

RESEARCH THAT CHANGES LIVES

Prof Maggi Linington, Executive Dean of the College of Agriculture and Environmental Sciences, said that Unisa prioritised responsive research initiatives that change the lives of ordinary people. "As a university, community outreach is not an extra, but an important part of the triangle of our key university priorities. We are proud of products that benefit mankind. I would like to urge everyone around here to use this water sparingly so that it benefits everyone," she said.

Unisa and Alfred Nzo District Municipality Fog Water Harvesting Event Management Team during the launch of the project.

University of South Africa's (Unisa) College of Agriculture and Environmental Sciences offers both technikon and university programmes. Its two Schools are:

The School of Agriculture and Life Sciences, including:
- The Department of Life and Consumer Sciences.
- The Department of Agriculture, Animal Health and Human Ecology.

The School of Environmental Sciences, including:
- The Department of Geography.
- The Department of Environmental Sciences.

One of its greatest strengths is the close working relationships with industry and government. All qualifications have been specifically designed to meet the skills needs of employers and many opportunities exist for students to work on government and industry-led projects.

The project leader, Prof Jana Olivier, who has over 20 years' experience in fog water research, revealed that the Cabazane project was the latest, most efficient system and could yield hundreds of litres of water daily. The system was designed to be used in rural regions, to be as cost effective as possible, to use readily available material, in areas without electricity. "Our system is very simple to erect and it can yield a lot of water depending on the quantity of fog on a given day. This particular system covers 700 square metres and can yield over 3,000 litres per day," she said.

The Executive Mayor of Alfred Nzo District Municipality, Gcinikhaya Mpumza, said they will develop vegetable gardens around the project so local, unemployed women can feed their families. "While we have a high rate of unemployment in this area, we have been sitting with over 40% of water shortage and with this water project we will be able to diversify some of the projects that have been on hold because of water scarcity."

College of Agriculture and Environmental Sciences, Unisa
www.unisa.ac.za/caes

UNISA college of agriculture and environmental sciences

THE AIR WE BREATHE IS THE WATER WE NEED

There is a global water crisis in the making. By 2025, nearly 2 billion people will be living in countries or regions with absolute water scarcity. By 2025, almost three billion people worldwide will not have enough access to clean water. By 2025, the UN believes disputes over water rights will be the main reason for international conflict.

One major water resource is present everywhere, but still unexploited on the larger scale. Air constantly retains a degree of water vapour, or moisture, even in deserts. Wherever there is air, there is water.

CHANGING AIR INTO WATER

First the air needs to be condensed into liquid. Typically this is done by using a cold surface on which moisture condenses into droplets. However, artificially producing a cold surface requires electricity. And to make a lot of water, you need a lot of electricity. The regions suffering from the worst water stresses ironically tend to be where electricity is the least available. Until now, air as a water resource has just been a dream.

Swedish company, Airwatergreen, has developed the unique CMCR (Controlled Moisture Capture and Release) technology which condenses water vapour using only heat, not electricity. The brilliance of using heat instead of electricity is that it enables people to utilise every square metre of sunlight up to seven times more efficiently than electric products.

Today, solar heat collectors can reach an efficiency of about 70% or more, whereas the same figure for photovoltaic solar cells barely reaches 10%. Furthermore, solar heat panels are significantly cheaper to manufacture than photovoltaic solar cells, and they are more robust.

The CMCR system, called Airwaterwell, turns one square metre of sunlight into one litre of water every three to five hours, depending on the relative air humidity. It doesn't need a grid connection and has no limitations on location. It can be installed in the middle of a desert or on the rooftop of skyscraper, providing the building with water and dry air, at no energy expense.

This means there is less need to transport bottled water across huge distances, where there isn't any piping, leading to significant savings in CO2 emissions, and less hard labour for those who have to fetch their water from a well far away.

Based in Uppsala, Sweden, Airwatergreen specialises in innovative water technologies. The company, founded in 2009, developed the unique CMCR technology for cost-efficient and heat-based condensation of water vapour. Airwatergreen's main aim is to turn air into a fresh water resource accessible to people worldwide.

DEFINING THE WATER CRISIS

The current water crisis results from an ever-increasing demand for water. This has led to an over-exploitation of natural water sources, like rivers, lakes and underground aquifers. In turn, supply has decreased. Normally when demand out-strips supply, prices spiral upwards – the water market is no different. Inevitably people will have to spend more of their daily income on water, and indirectly on food.

Either people start using water with greater care or people have to find more water. The only cost-competitive option so far has been the desalination of seawater. Desalination demands energy input, and more specifically electricity. The majority of today's electricity production comes from non-renewable energy sources; hence desalination and CO2 emissions are inextricably linked.

For regions trying to reduce their carbon footprint, while at the same time fight the water stress, it's a time to think creatively across a range of solutions.

Airwatergreen
www.airwatergreen.com

Airwater green

- Addressing the Global Water Crisis

In 2025, the UN expects three billion people worldwide to suffer from water shortages. The ever-increasing usage of fresh water, combined with the growing over-exploitation of our natural water sources, will make disputes over water rights one of the main reasons for major international conflict.

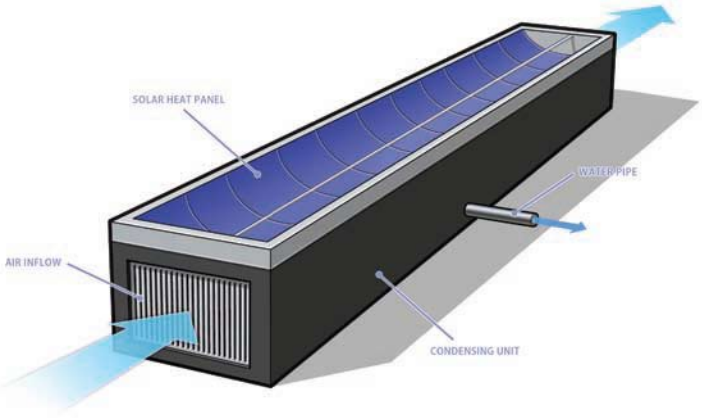
Air - Earth's largest unexploited fresh water source

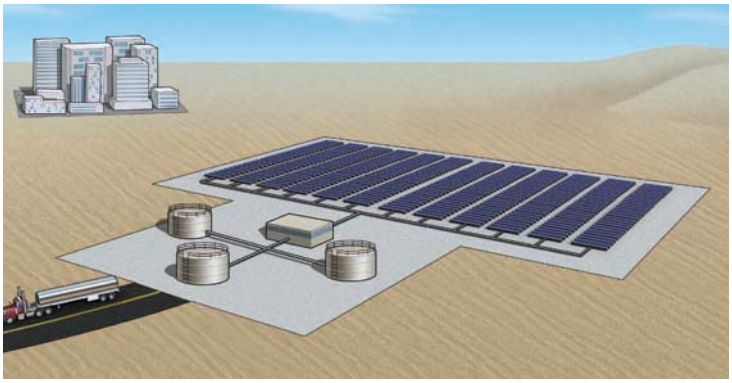
In order to expand the range of water resources, we need to further explore what is already available. Air always holds a certain amount of water called moisture, in the tropics as well as in the deserts. However, due to a lack of cost-efficient technologies, the air has been virtually unexploited as a water source – until now.

AIRWATERWELL

- A unique water solution

Airwatergreen is developing Airwaterwell™, a unique and electricity-free, solar energy based system, able to produce clean, drinkable water directly from the surrounding air. Airwaterwell™ is based on Airwatergreen's unique heat-based CMCR technology, which condenses water vapour from air without requiring any electricity in the process – only heat. Depending on the relative air humidity, Airwaterwell™ has the capability to turn one square meter of sunlight into one liter of clean, drinkable water every 3-5 hours. By adding or subtracting Airwaterwell™ units, the water production capacity can easily be scaled up or down to suit the specific water demand.





Water Farms
- Local Production of Clean, Drinkable Water

Airwatergreen aims at developing large water producing plants - Water Farms - fully based on the Airwaterwell™ system. These Water Farms can be located anywhere in the world, even in deserts, and will produce clean, drinkable water without energy expenditures and at a cost no one else can match.

For more information about Airwatergreen, our products or potential partnerships, please contact:
Mr. Jonas Wamstad, CEO • E-mail: Jonas@airwatergreen.com • Telephone: +46 708 671 138

www.airwatergreen.com

BEYOND COMPLIANCE – EFFICIENT MINING

Lonmin is one of the world's primary producers of platinum group metals (PGMs) and one of only three integrated mine-to-market PGM companies, creating wealth through the discovery, acquisition, development and marketing of minerals and metals.

There are sound business reasons for going beyond compliance in terms of social and environmental performance, with adequate and appropriate resources for implementing effective risk management. Mine-to-market company Lonmin explains how they build sound practices into their work culture and how an integrated Sustainable Development Strategy forms part of the Life of Business Plan for operations.

They are committed to directing adequate and appropriate resources for implementing effective risk management across operations. This is based on valid data and sound science in order to reduce the risks and mitigate impacts. The management of risks is underpinned by the company's Safety and Sustainable Development Policy and supported by strategies, plans, targets, standards and guidelines.

South Africa is regarded as a water-stressed country; with water resources already under pressure, it is clear that water is the medium through which many of the impacts of climate change will be felt. Lonmin is reliant on water throughout the value chain; with the principal risk being the security of adequate water supply to sustain and expand operations.

The company is investigating strategies and methods of utilising water more efficiently and effectively going forward, including implementing an integrated water balance and developing various strategies to ensure access to water in the long-term business plan.

Electricity from the national grid represents 80% of total energy consumption and indirectly is the firm's greatest source of greenhouse gas emissions. Their approach to energy management centres on integrating energy efficiency considerations into business strategies, improving energy efficiency at existing operations and investigating alternative low emission energy sources.

This is being undertaken through the adoption of best practices, energy-efficient technologies and mechanisms which focus on alternative sources. Efficient, real-time electrical energy and demand management control systems are in place to monitor maximum demand and consumption across the operations.

DIVERTING WASTE

Global methane emissions from landfill are estimated to be between 30 and 70 million tonnes each year. Lonmin is actively implementing projects and initiatives to divert waste from landfill and incineration, reducing methane generation and emissions.

They are also improving on waste loading and transport efficiencies by refining logistics. Waste prevention, in the form of cleaner technology, is being investigated to convert waste streams to beneficial products, in addition to introducing green procurement practices, and improving housekeeping and hazardous materials handling.

Treatment and recycling of liquid waste streams is a core focus area in the short term, with the spin off being the efficient reuse of water resources and improvement on consumption patterns. Importantly, by introducing appropriate waste management, and ensuring buy-in from all employees, the shift created by this awareness and entrenchment in the business goes beyond the workplace.

It is efforts like these that will, jointly with wider society, hold significance on a local, national and global scale.

Lonmin
www.lonmin.com

LONMIN

LONMIN - GOING GREEN

Lonmin is one of the world's primary producers of platinum group metals (PGMs) and one of only three integrated mine-to-market PGM companies, creating wealth through the discovery, acquisition, development and marketing of minerals and metals.

www.lonmin.com

DELTARES: ENABLING DELTA LIFE UNDER CLIMATE CHANGE

'We cannot simply wait and see what climate change brings'

Deltares Hydraulics is a leading, independent, Dutch-based research institute and specialist consultancy in matters relating to water, soil and the subsurface. We apply our expertise worldwide to help people live safely and healthily in delta areas, coastal zones and river basins.

To achieve this, we constantly extend our knowledge base via government research programmes and contract research, forming consortia with universities and other research institutes, encouraging innovation, and accelerating the practical implementation of new theoretical advances. Our aim is the sustainable enhancement of the living environment, with technical solutions that have the support of society as a whole, putting into practice our strategic principle: 'Enabling Delta Life'.

TECHNOLOGY AND ADAPTATION

All over the world, habitable space in deltas and river basins is under increasing pressure from economic expansion, growing populations, soil subsidence and the impacts of climate change. We have the knowledge and resources to tackle water and subsurface issues worldwide in a new, integrated way. It means we should never focus exclusively on technological issues. We have invariably to take account of ecological factors and administrative constraints like spatial planning, with all the associated policy agendas, competing interests, and legal and economic processes.

Our expertise produces solutions that are more sustainable, better for local people and often more economical. For example, counteracting erosion in coastal areas by sand nourishment has benefits for safety, nature and recreation in a way dams and barriers cannot achieve. Green Adaptation, Building with Nature, Ecodynamic Design or Green Infrastructure are areas to combat the possible impacts of climate change.

DISASTER MANAGEMENT

Many innovative services and products are available that can be used in the various phases of disaster risk management, from prevention and preparedness (early warning, risk communication, flood protection, risk assessments) to response (emergency water supply, damage and needs assessments) and recovery (restoration and reconstruction) when a disaster really happens. The perception among citizens on self-efficacy and more flood sensitive behaviour is crucial to successful risk communication.

WATER MANAGEMENT

In the coming years urbanization will continue to push up the social and economic value of cities. This means that they become more and more vulnerable to extreme weather conditions. Water-robust structuring of urban areas is crucial for planning and development.

CLIMATE CHANGE ADAPTATION

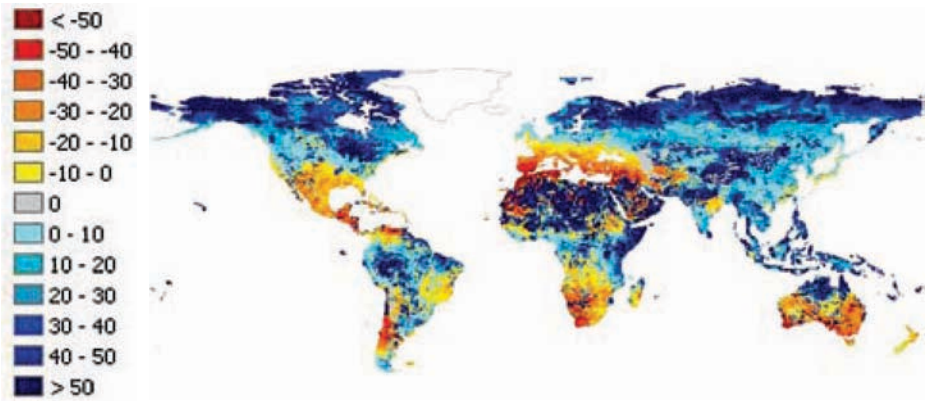
Climate change is likely to threaten people living in delta areas all over the world. Rising sea levels, combined with an increasing variability in river discharge and in precipitation, increase the risk of floods and droughts. New concepts for flood and drought management, as well as adaptive strategies for spatial planning and the development of infrastructure and ecosystems management are needed as part of an integrated approach.

PREPARATION OF WATER SCENARIOS

Accurate predictions of the demand and availability of water are essential for the development of water management plans in a dynamic environment. To assess possible impacts of climate change, results of climate models are being combined with hydrological modelling, and downscaled to the desired level of aggregation and further use. There is a clear need to improve our assessments for investments, in order to support sound decision making by policy makers, investors and private enterprises.

DELTA ALLIANCE

The international Delta Alliance has been set up to study delta issues in depth and help achieve sustainable solutions. It is a network facilitating the interaction of low-lying deltas around the world. Late 2010 it issued its first comparative study, casting light on the vulnerability and resilience of ten delta areas around the world.



Global assessment of relative change (%) in river discharge and fresh water availability under changing climate conditions (IPCC scenario A1B for 2100). Author: Frederiek Sperna Weiland, Deltares, the Netherlands.

Deltares
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www.deltares.nl
www.delta-alliance.org

Deltares
Enabling Delta Life

MANAGING WATER RESOURCES AT THE COMMUNITY LEVEL

Properly managed water resources are critical to tackling poverty and development – climate change is increasing the complexity of this problem. South Africa's Breede-Overberg Catchment Management Agency (BOCMA) explains how the establishment of Catchment Management Agencies (CMAs) delegates water resource management to the regional level and involves local communities within the framework of a wider national water resources strategy.

Good administration of registration and licensing allows all stakeholders a voice in how water resources are managed. The region's land use is currently dominated by commercial agriculture, ranging from intensive irrigation to extensive rain-fed cereal cultivation and livestock production. Irrigated agriculture (wine and table grapes, dairy and deciduous fruit) livestock farming, dry land agriculture (wheat and canola) and associated activities such as processing and packaging are the region's primary economic activities.

There are also a number of smaller urban centres and some industrial activity, primarily associated with agriculture. Parts of the Water Management Area (WMA) are protected areas and biosphere reserves, with important biodiversity conservation status. A number of estuaries along the coastline are important recruitment zones for commercially exploited fish and are popular tourist destinations. The Breede-Overberg WMA produces 70% of South Africa's table grapes, apples and indigenous flowers (Fynbos) for international export.

BOCMA works closely with local governments on water management and water-related services. This ensures synergy between the priorities of the CMA and the local and district municipalities. Legal, policy and regulatory tools are critical for communication, awareness building, response, and for building the natural resource and infrastructural capacity. The uncertainty introduced by climate change means exact solutions cannot be planned; building a natural ecosystem, infrastructural and institutional resilience will enable the best responses.

Institutions capable of learning and adapting to a rapidly changing environment are essential for finding solutions to climate-change related problems. Institutional capacity is critical to encourage economic sectors to adopt products and processes appropriate for changes in climate.

BOCMA's integrated water programme includes the:
- Implementation of the ecological and the basic human needs reserves.
- Protection and conservation of wetlands, estuaries, rivers and critical biodiversity areas.
- Building of adaptive institutions within all sectors and at all levels.
- Implementation of water-use conservation strategies.

Water is increasingly being recognised as a critical resource to support social well-being, biodiversity and economic development. The agency aims to inspire a change in attitudes towards the environment, to manage the ecosystem in a sustainable manner, and to promote sustainable economic growth. It is addressing water allocation reform to ensure fair, equitable and well controlled water allocation, while maintaining the integrity of the natural resource. Quality water for all people and the environment is essential so people's developmental needs can be addressed and poverty tackled.

The Breede-Overberg Catchment Management Agency is the second CMA in South Africa. Its Water Management Area is in the south-west corner of South Africa and the name is derived from the Breede River, the largest river in the Water Management Area. With seven local municipalities and two district municipalities, the population of the Breede-Overberg WMA is estimated at half a million people, with two thirds living in towns and villages.

The strategic focus of the agency incorporates:
- Water resource planning.
- Water use management.
- Institutional development.
- Water resource protection.
- Water allocation reform.

Breede-Overberg Catchment Management Agency
www.bocma.co.za

BREEDE-OVERBERG
Catchment Management Agency
Opvanggebied Bestuursagentskap
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MINING FOR GOLD – AND MANAGING THE CARBON

The harmful effects of carbon dioxide and other greenhouse gases on climate change mean the world economy is slowly changing from being fossil fuel and carbon-based to being carbon-constrained. Companies wishing to thrive in the new economy must realise the importance of having an integrated carbon management strategy. This is now a sustainable business imperative. Without such a plan, their ability to operate effectively and profitably in the future will be compromised.

Gold Fields Limited, the South African-based gold mining company, recognises that global warming and associated climate change are a reality any 21st-century organisation needs to understand and respond to, in order to do business. In its pursuit of being the global leader in sustainable gold mining, Gold Fields is committed to contributing to a global solution through the deployment of responsible strategies and actions.

To this end, the company has adopted a Carbon Policy statement, which says "We are committed to designing and implementing strategies that seek to reduce the company's carbon footprint, improve energy efficiency, determine the risks posed by climate change, quantify our carbon footprint and comply with all applicable legislative requirements as well as disclose such information comprehensively".

Accordingly, the company has not only adopted a Carbon Policy statement, it has also compiled a comprehensive, integrated Carbon Management Strategy, which is being implemented by all the operations within the group. This strategy seeks to provide an enabling environment in which carbon – and climate change – related issues are incorporated into business planning models and decision-making processes throughout the organisation.

As part of its response to climate change, Gold Fields has established itself as a credible, responsible corporate citizen. During 2007 and 2008, the company determined and disclosed its carbon footprint to the Carbon Disclosure Project (CDP). As a result of the quality of its submissions, it ranked second in the 2008 Carbon Disclosure Leadership Index (CDLI) among the Johannesburg Stock Exchange's (JSE) Top 100 carbon intensive sector. In the 2009 CDLI, it was ranked fifth and in 2010 it was joint first. In the 2010 CDP Awards, the company was also ranked as one of the top four Top 100 JSE companies in terms of their strategies to mitigate the impact of high carbon emissions.

In June 2010 Gold Fields' Beatrix Methane Project also won Energy Risk magazine's 2010 Deal of the Year award for becoming the world's first gold mining company to sell Certified Emissions Reductions (CERs), the financial securities used to trade carbon emissions.

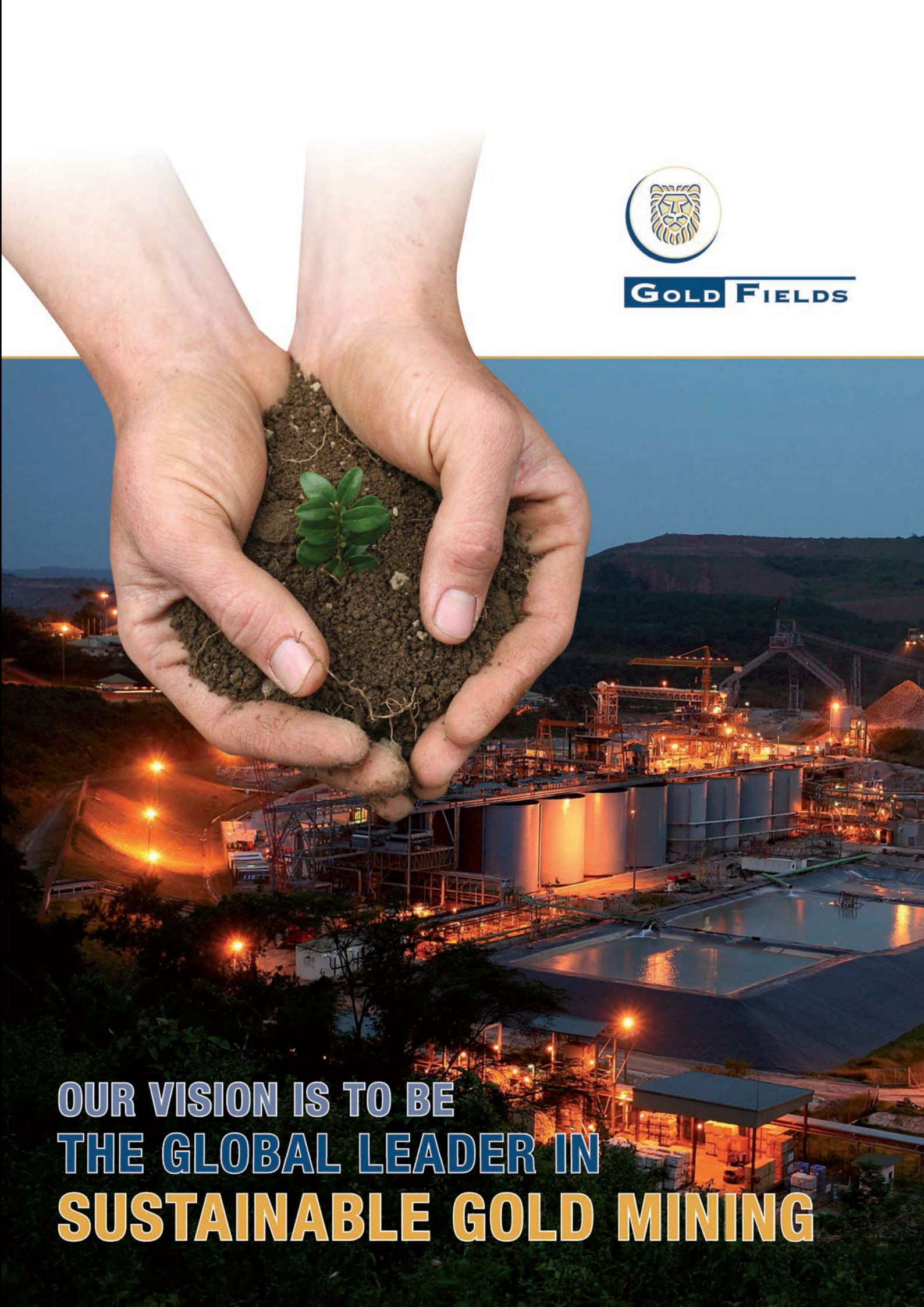
Through the implementation of its integrated carbon management strategy, Gold Fields will seek to:

- Limit its liabilities ahead of impending emissions regulation.
- Enhance its corporate reputation by being an industry leader in sustainable mining.
- Increase perceived company valuation and access to capital.
- Improve employee wellbeing and pride.
- Reduce the impact of volatile weather conditions through planning and appropriate investments.
- Decrease energy costs through improved energy efficiency and lower emissions.
- Increase revenues through opportunities such as carbon trading.

At present, the strategy has been distilled into 15 key initiatives or work stream elements. The implementation of these initiatives will result in the comprehensive rollout of the Gold Fields Carbon Management Strategy. Although the development of the carbon management strategy has, until now, been focused on the company's South African operations, the strategy is being rolled out across all operating regions in the foreseeable future.

Gold Fields Limited
www.goldfields.co.za

GOLD FIELDS


GOLD FIELDS
OUR VISION IS TO BE
THE GLOBAL LEADER IN
SUSTAINABLE GOLD MINING

WEEDING OUT CLIMATE CHANGE

A recently published UN report stated that organic farming is the solution to the food crisis. A shift to a more ecological agriculture could result in a doubling of food production. It would especially benefit environments where it is difficult to grow crops and directly help poor countries.

During trials, the harvest of spring barley increased significantly in the pots of grain with cut thistle compared to untreated pots. (76- 94% higher grain yield).

The report states that today's farming is costly, inefficient and lacks adaptability to climate change. In order to provide the nine billion people by 2050 with food, farmers urgently need to adapt to more efficient farming techniques. But one big issue with organic farming is finding weapons against weeds, and, in particular, thistles which threaten much of the organic grain crop.

Swedish organic farmer, Jonas Carlsson, faced this problem, but dug up a solution. Under the business JustCommonSense – highlighted by the Nordic Council of Ministers as one of the most interesting cleantech companies internationally – he developed a revolutionary technology, the weed cutter CombCut, a new environmentally-friendly way to fight thistles.

This war on thistles has already won high scientifically documented acclaim and is ideal for organic farming and IPM (Integrated Pest Management). It is completely mechanical, eco-friendly and does not use chemicals. CombCut is the perfect choice where other weed control methods are not permitted or suitable, for example in organic crops, spray-free zones or grazing leys.

The cutter combines efficient weed control with low weight and decreased need for energy-demanding weed control tillage or chemicals that can otherwise cause nutrient losses to air and water. It uses a new, patented method which exploits physical differences between crop and weed, such as stem thickness and branching pattern.

HOW IT WORKS

First CombCut is lowered into the growing crop as close as possible to the soil depending on the field's condition. The closer to the soil CombCut is driven, the greater the proportion of weeds destroyed.

As the draught vehicle moves forward, CombCut combs through the crop and cuts or crushes the coarser weeds, while the thinner crop plants, such as cereals and grasses, pass undamaged through the fixed blades. The weeds are cut or damaged because they are too thick to slip through.

There is a fixed scissor-like construction on every blade which is immobile. This mean it does not operate in the same way as an ordinary mowing machine. The tool has a central setting system, but each blade can be repositioned as necessary. Above the blades, driven by a hydraulic motor, is a revolving brush that prevents clogging and helps comb through the vegetation. The coarser weeds are cut off completely or severely damaged, ideally at speeds of around 10 km per hour.

Anders and Oskar Karlsson at Tjulsta Farm in southern Uppland are completely satisfied. They made an extensive test last year and this year they bought a further developed machine.

"The implement is extremely effective against thistles and almost invaluable for us, but another thing that feels very good is that it´s energy efficient as fuel consumption stops at a few litres per hectare," says Anders Karlsson.

Competition from the crops, as they are now stronger and dominant, then inhibits the cut or damaged weeds and prevents them from regrowing. It is most effective when the difference between weed and crop is the greatest, for example just before stem elongation in cereals. CombCut has been used successfully on most troublesome weeds and has a proven effect on thistles and pale persicaria in leys and cereal stands.

In a three-year research project funded by the Swedish University of Agricultural Sciences, this weed cutter was evaluated and its effectiveness proved. The project has been awarded funding for an additional three years of research on the effects on other weeds and other crops.

Just Common Sense
www.justcommonsense.eu

Just Common Sense CombCut®
Growing green technology

Turning Waste into Wealth
Turning Pollution into Profit

Thai company, **Flexoresearch**, has developed a novel series of blended enzymes that recovers pulp from non-recyclable laminated paper waste in operation in two pulp recovery mills, one in Thailand and another in Malaysia. The enzyme formula causes the plastic and paper to separate easily, creating valuable recyclable paper pulp and recyclable plastic. The pulp is then used, instead of the virgin pulp, in the paper-making industry or to replace asbestos in building materials while the recovered plastic is supplied to plastic recycle companies.

Flexoresearch is now licensing this enzymatic technology to Advanced Enzymes Industries, a South African company, to do the laminated paper waste pulp recovery in 15 African countries, but is looking to extend further and bring a force of change for a better world.

Named Technology Pioneer of 2011 (previous recipients of which include Google and Twitter) in the clean tech category by The World Economic Forum, TIME Magazine selected the company as one of the "10 Start Ups that will change your life".

FLEXO RESEARCH

www.flexoresearch.com

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RTCC
Responding to climate change

THE AUTOMOBILE INDUSTRY CROSSES THE RUBICON

The global automobile industry underwent significant transformation in 2009. Demand in the market plummeted amid economic decline triggered by the financial crisis, and parts manufacturer, DENSO, was confronted with the most difficult conditions since its founding. While on track for recovery, albeit moderately, the industry has changed significantly in terms of environmental technology and its operation in developing countries.

In environmental technology, society and consumers have ever-increasing expectations for environmentally-friendly vehicles. Accordingly, automakers have accelerated development of technologies that emphasise energy efficiency and CO2 reduction using all sources of power, with apt examples being hybrid and electric vehicles. The industry aims to capitalise on these changes and maximise the use of energy management technology, an area of comparative advantage at DENSO. By doing so, this opens up the opportunity to contribute to an automotive society that has less environmental impact.

Emerging countries are becoming increasingly important in the automobile industry; China recently overtook the United States as the world's largest automobile market. In China, India and other emerging economies, many people aspire to own a car. One of DENSO's key missions is to provide products to these markets that ensure safety and comfort while having minimal environmental impact. To this end, they promote the creation of a system for the swift development, production and sale of products befitting the economy, infrastructure characteristics and unique needs of each country and region.

Innovative, new generations of products are manufactured in India, Brazil and China, such as alternators, Common Rail system and UC injectors in China, alternators and electronic parts in Brazil.

CONVENTIONAL IS DECADENT

Genuine CSR-oriented management depends on everyone feeling a sense of ownership. Staff need to develop increasing awareness of their immediate surroundings and be encouraged to participate in solving problems. In 2006, the company placed CSR at the core of management with a policy and structure to support it while permeating it throughout the entire group, the supply chain and wider stakeholders.

Upon becoming aware of an issue, DENSO believes we must clarify our position and work out a solution without being bound by stereotype or convention (for example, the company's work on producing biofuels from microalgae). Their long-standing tradition of pooling collective knowledge and capabilities is integral to this.

DENSO has achieved growth continuously for 60 years in local and international communities by addressing stakeholder needs and developing ongoing efforts to change without falling back on conventional methods in manufacturing and hitozukuri (human resource development). Continuous improvement ensures innovation and new challenges, keeping them ahead of the competitors. Conventional methods lead to invisible decadence.

The company channels this wisdom, passion and ability to contribute to environmental preservation and a reduction in traffic accidents through the development of next-generation vehicles, and grow into an organisation that practices genuine CSR-oriented management and garners the respect of local and international communities.

Established in 1949 as Nippondenso Co., in 1996, it became DENSO Corporation worldwide. With 184 subsidiaries (68 in Japan, 34 in the Americas, 34 in Europe and 48 in Asia/Oceania), the company has over 120,000 employees. It is a member of the Toyota Group of companies.

DENSO provides products that lead to improvement in fuel consumption in cars using diverse sources of power, from development of engine injection control to drive control for hybrid systems and energy-saving car air conditioners.

DENSO Corporation
www.globaldenso.com/en

THE GREEN LIGHT TO GO

Lighting is a key global focus when it comes to energy efficiency. It's common knowledge that standard bulbs not only consume a great deal of power, but are also environmentally unfriendly in their design and production – hence the ongoing focus on new generation lighting systems.

In South Africa, the free give-away by Eskom of CFL light bulbs has been a moderately successful attempt to get a grip on the Demand Side Management (DSM) portion of the South African power conundrum. But, despite this advance, the reality is that not all lighting solutions are equal. When it comes to the quality of light produced, the general environmental impact of different bulbs and the cost savings the varying solutions offer, differences can be dramatic.

"As new players and products emerge at a rapid rate, so the need for technical clarity grows. Companies really should be putting a far stronger focus on the technical details of various solutions and products," says Francois van Tonder, Managing Director at Lemnis Lighting Africa, the producer of industry-leading Pharox LED bulbs.

LIGHTING AND CLEAN DEVELOPMENT

Lemnis Lighting is the only LED lighting company in the world qualified by the South African Department of Environmental and Tourism affairs to supply certified national greening products. The firm is also the first LED CDM carbon project in the world. This means Lemnis Lighting clients can formally offset their lighting system development costs against their carbon emissions, and can also gain carbon credits by developing a lighting system in partnership.

"The equation is not just about cost savings, it's about full participation in the green economy when it comes to things such as carbon credits," says van Tonder. "To a lot of architects and business people, carbon credits are something to do with the future. But in fact they have quickly become a business reality. They need to be factored into decision making."

In addition to broad themes such as carbon credits, van Tonder highlights five significant technical points architects and project managers should bear in mind when addressing the lighting installations in new and retrofitted projects.

1. Warm white light – LED bulbs produce warm white light, which is the ideal replacement for traditional halogen and incandescent lighting.
2. Lower maintenance costs – New generation LED lights have a lifespan of up to 35,000 years, which reduces lighting maintenance costs significantly.
3. Mercury content – LED bulbs are the only way to ensure mercury free lighting.
4. Recyclable – The best new generation LED lights are manufactured according to a cradle to cradle philosophy. The recyclable portion of the light should be in excess of 90%.
5. Long lasting products – The light source of the Pharox LED bulb is actually a microchip, so the globe runs far cooler than traditional products, and is much longer lasting and more efficient.

"Research, research, research" says van Tonder. "That's the only way to make sure that the system you're using in a project is as cost effective, efficient and green as the service provider claims. The reality is that one LED solution can be as much as 50% more efficient than another. So professionals owe it to themselves to do their homework, and to take the broadest view possible of each system and the bottom line green benefits it actually offers. At Lemnis Lighting this is certainly our focus – taking a broad, holistic view ensures that our products are able to remain the market leaders."

Lemnis Lighting Africa
www.pharox-led.com

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LED's save energy!

NATIONAL GREENING

Changing the way the world is lit.

Since 2006, we have sold millions of bulbs, making Pharox the #1 LED brand in the world. We bring you innovative lighting solutions that are as good for the planet as they are for your home.

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HOW A HOUSE MADE OF WOOD REDUCES CO2 EMISSIONS

One of the biggest contributors to CO2 emissions is the construction industry which contributes approximately 40% of all CO2 emissions. Creating more energy-efficient and more carbon-neutral dwellings is one of the low-hanging fruits in any strategy to reduce CO2 emissions.

As an ecologically friendly and renewable resource, wood reduces the effect of global warming as trees and wood products act as carbon sinks. Another advantage is that the wider timber frame industry uses less energy than the manufacture of other building materials such as cement and brick. Scientific research has shown one cubic metre of wood saves two tons of CO2 and an 86% reduction in greenhouse gas emissions is possible by increasing the amount of timber used in a building.

FULFILLING GLOBAL REGULATIONS

In the European Union (EU), directives on building regulations are being adopted in the member states to improve energy efficiency by 40% and reduce CO2 emissions by 40% with the aim of ultimately achieving a zero carbon standard for new houses in the medium term. Although South Africa is further behind Europe, they have established the Green Building Council which is adopting a six-star rating system to evaluate the environmental friendliness of buildings.

A timber frame method of construction already meets this EU requirement. Nitalis is currently investing in Enviro-friendly Building Solutions (EBS), a significant opportunity, both in terms of a financial solution as well as addressing social and ecological issues. This is a timber frame house manufacturing and engineering company which uses a factory-based production system to quickly construct quality pre-fabricated timber frame houses that are then assembled on site.

Timber frame houses have a much smaller carbon foot print than traditional building. Starting upstream in the value chain, EBS sources its timber from companies that harvest their forests in an environmentally sustainable way. For every tree that is cut down, two new trees are planted. The factory production process, as well as the materials used, emits less CO2 and energy. Every cubic metre of wood used in a house saves two tons of CO2.

The construction site is also much more eco-friendly as most of the construction takes place within the factory. The result is less waste and a cleaner building site which is less subject to the vagaries of weather.

International investment company Nitalis recognises the importance of innovation and working in emerging and niche markets to achieve greater returns.

This value affects the way Nitalis adopts strategies, evolves solutions and achieves goals. Awareness of emerging markets and changing trends leads to a creative approach and ensures solutions are re-evaluated where necessary to achieve better results.

As a business adviser, Nitalis is constantly thinking of new and exciting opportunities where anything is possible. This has the added advantage of being able to address important worldwide challenges, such as environmental issues.

Although already a natural insulator, timber frame walls have additional insulation fitted as standard during the manufacturing process. A well-designed, well-insulated and airtight timber frame dwelling is thermally very efficient. This lowers heating bills. Independent studies have shown a reduction of 32% in heating costs can be achieved when building in timber frame.

But beyond this, wood is healthy. An old Chinese proverb says: "If you are sick go to a doctor. If you are still sick go and live in a wood house." Due to the organic breathable nature of wood, timber frame houses are healthier than normal houses and do not suffer from damp and humidity.

Nitalis
www.ebs-homes.co.za

NITALIS GROUP

NITALIS

IF YOU CAN IMAGINE IT, WE CAN ACHIEVE IT

Nitalis is proud to present a significant added value opportunity, both in terms of a financial solution as well as addressing social and ecological issues.

As a creative and innovative business advisor, Nitalis recommends Envirofriendly Building Solutions (EBS) as a valuable financial solution throughout the world. EBS is a manufacturing and engineering company that produces timber framed houses. It uses a factory based production system to quickly construct quality, pre-fabricated timber framed houses. The buildings are assembled on site up to 70% faster than traditional brick and mortar. Nitalis believes that this building system will radically change the way houses are built across the world.

EBS is a manufacturing and engineering company that produces timber framed houses. It uses a factory based production system to quickly construct quality, pre-fabricated timber framed houses. The buildings are assembled on site up to 70% faster than traditional brick and mortar, allowing the capital to be unlocked sooner. For decades, timber frame has been a tried and tested building method for houses worldwide and Nitalis believes that this building system will radically change the way houses are built across the world.

This system is more economical and requires less time and fewer materials, resulting in houses of a superior quality with an energy saving, ultimately leaving a smaller carbon footprint. Although this technology is prevalent in the northern hemisphere (Europe, USA and Japan), factory-engineered houses remain largely unknown in the rest of the world. The aim of EBS is to bring this innovative building system to the rest of the world with the establishment of factories in a variety of emerging economies, so that higher quality homes can be supplied to the affordable housing market.

The vision of EBS is to build houses across the globe that are economically affordable but also energy efficient and environmentally friendly. In so doing, a contribution will be made to addressing the critical housing shortage affecting the world, while creating village communities globally, living in harmony with each other and the environment.

www.ebs-worldwide.com
info@ebshomes.co.za

FLYING ON THE POWER OF TECHNOLOGY

Air travel is the world's fastest growing source of greenhouse gases (GHG), annually generating over 600 million tonnes of carbon dioxide (CO2). The huge increase in aircraft pollution is largely due to the rapid growth in air traffic which has been expanding at nearly two and half times average economic growth rates since 1960. It is expected the number of people flying will double over the next 15 years. This means increasing airport capacity to cope with more flights, reducing pollution and handling crowded airspace.

ATNS, who run South Africa's Air Traffic Control Systems, are tackling this on all fronts. With an infrastructure that is constantly maintained and upgraded to increase efficiency, the need to apply the latest technology is critical to reducing emissions.

PERFORMANCE TAKES OFF

Performance based fuel-efficient flying navigation (PBN), a shift from sensor-based navigation, uses the improved navigation capability of aircraft to allow for more accurate operations throughout flight. This leads to reduced separation between aircraft and optimum trajectories, resulting in less fuel burn, CO2 and noise. Approaches which are in a continuous descent allow for aircraft to use minimum power setting. Reduced separation means aircraft can operate at optimised cruising levels with reduced vertical separation standards, dependent on the aircraft and flight crew certification.

PBN also decreases aviation congestion and the impact of aircraft noise and maintains reliable, all-weather operations, even at the most challenging airports. It provides operators with greater flexibility and better operating returns while increasing the safety of regional and national airspace systems.

The procedures ATNS developed for Durban's King Shaka International airport go further and allow for clean speed arrivals and departures and shortened routings. The term *clean speed* indicates that an aircraft flies at a speed and power setting which do not require the use of additional control surface such as flaps and slats.

The Central Airspace Management Unit (CAMU) division of ATNS utilises a number of techniques at the strategic and pre-tactical operational planning phase to balance demand and capacity and minimise potential delays in the national airspace. These include the allocation of arrival and departure slots and thereafter dynamic allocation of calculated take-off and arrival times on the day. These two techniques mean delays from operational and weather events are minimised, and the engine of waiting aircraft is not kept running, contributing to the reduction in GHG in the airport environment.

AIRCRAFT GO ROGUE

ATNS has also been instrumental in rolling out random routing across the Atlantic and Indian Ocean. Aircraft can make optimum use of upper winds in their route planning and execution, enabling higher efficiencies, less fuel burn and less CO2 emissions.

INSPIRE, a collaborative industry initiative, focuses on the Indian Ocean region and includes as working partners, ATNS, Airservices Australia (ASA) and Airports Authority of India (AAI). It is designed to lessen the environmental impact of aviation through the operational procedures for all phases of flight on a gate-to-gate basis. Demonstration flights aim to showcase the efficiency and emissions reductions achieved through the use of advanced air traffic management procedures in every phase.

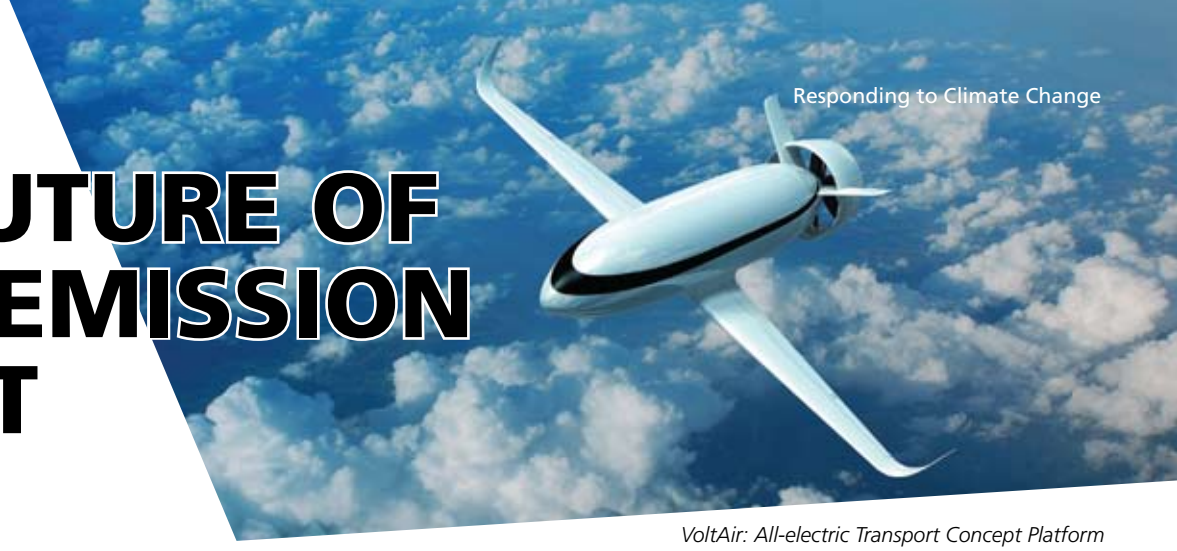
The initiative builds on the green ATM procedures and technology demonstrated in the Asia Pacific through the Asia and Pacific Initiative to Reduce Emissions (ASPIRE) partnership, extending the benefits across the Indian Ocean.

The Air Traffic and Navigation Services Company of South Africa (ATNS) was incorporated in 1993, and is mandated to provide safe, expeditious and efficient air traffic management solutions and associated services within the South African airspace in accordance with International Civil Aviation Organization (ICAO) Standards and Recommended Practices and the South African Civil Aviation (SACAA) Regulations and Technical Standards.

With over 950 dedicated and professional employees, ATNS manages more than half a million aircraft arrival and departure movements a year. It operates at 22 airports across South Africa and is responsible for 10% of the world's airspace.

ATNS
www.atns.co.za

THE FUTURE OF ZERO EMISSION FLIGHT



VoltAir: All-electric Transport Concept Platform

The aviation industry is setting up ambitious environmental protection goals, as seen in the European Commission's roadmap report, Flightpath 2050 – Europe's Vision for Aviation. This report sets targets to reduce aircraft carbon dioxide (CO2) emissions by 75%, along with Nitrous Oxides (NOx) by 90% and noise levels by 65%, compared to 2000 levels.

EADS Innovation Works is the corporate network of research centres of EADS. Its highly skilled workforce of over 700 staff operates the laboratories that will fulfil EADS' technical innovation potential with a focus on the long term.

Aerospace corporation, EADS, explains how their research department, EADS Innovation Works, is supporting this agenda with the development of an all-electric airliner, VoltAir.

ELECTRICALLY CHARGED AVIATION

Their VoltAir technology makes the vision of a zero-emission, ultra-quiet air vehicle a possible reality within 25 years. Powered by batteries, challenges remain in energy storage once the planes are off the ground. And the concept assumes the required level of energy density can be achieved within the targeted 25-year timeframe.

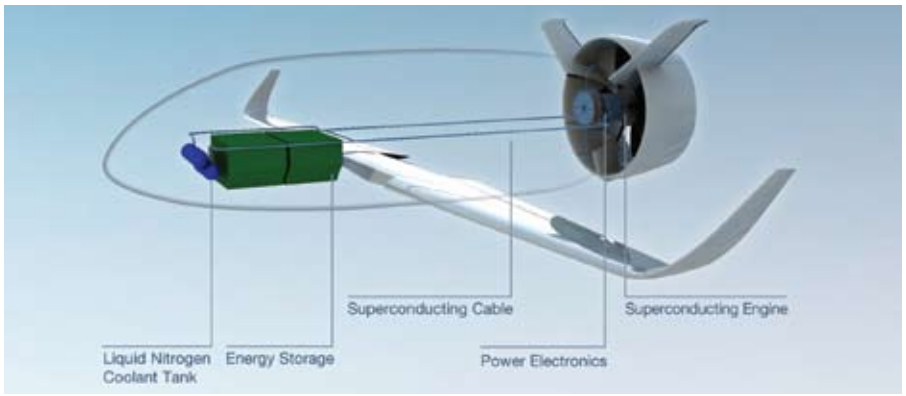
New materials with promising capabilities are based on lithium-air and lithium-sulfur combinations which scientists expect to exceed energy densities of 1,000 Wh/kg (Watt hours per kilogram) within the next two decades, a more than doubling of today's performance.

Lithium-air batteries have a higher energy density than lithium-ion batteries because of the lighter cathode, along with the fact that oxygen is freely available in the environment and does not need to be stored in the battery. VoltAir's batteries are integrated in replaceable, containerised units in the lower fuselage hold, enabling an easy replacement of depleted batteries at the airport, like loading and unloading of cargo. Performing the recharging and maintenance process on the ground reduces the system's weight and complexity onboard the aircraft, and allows for fairly conventional airport operations.

Although conventional electric motors are very efficient, they do not offer enough power density for large-scale airborne vehicles. High-temperature superconducting (HTS) materials, the basis for high density superconducting motors, are expected to exceed the power-to-weight ratio of gas turbine (turboshaft) engines as their development progresses.

The necessary cooling to reach superconducting temperature can be achieved with low-cost – and environmentally-friendly – liquid nitrogen. In the VoltAir concept, HTS motors are expected to reach power densities of 7-8 kW/kg with almost no electrical losses. This compares to 7 kW/kg for today's turboshaft engines.

In flight, passengers will appreciate the engines' extremely low noise level. The fully-electric propulsion system does not emit carbon dioxide or nitrous oxide greenhouse gases. Only small amounts of harmless nitrogen are disposed of overboard after being used to cool the superconducting electric leads and motors.



VoltAir: Next-generation Energy Storage

SLIMMING DOWN

An essential requirement for the VoltAir concept is a light and low-drag airframe. Advanced carbon fibre composite materials are used, and an unconventional configuration with an optimum fuselage thickness-to-length ratio minimises aerodynamic drag while providing a maximum useful internal volume for a better integration of the landing gear.

Unlike the fuels burned in a combustion engine, the electric energy storage system does not change its mass during the flight. This means batteries can be placed away from the aircraft's centre of gravity, balancing the propulsion unit's weight at the rear of the fuselage. As the engines and landing gear will no longer be attached to the plane's wings, the wing is aerodynamically clean, so it moves more easily through the air.

In addition to environmental targets, Flightpath 2050 addresses customer orientation and market needs as well as industrial competitiveness and the need to maintain adequate skills and a research infrastructure base in Europe. It also emphasises that technological leadership will continue to be a major competitive differentiator and that breakthrough technologies will be required to secure future competitive advantages.

EADS
www.eads.com/thinkbank

EADS

RENOVATING THE WORLD'S ENERGY EFFICIENCY POLICY

Last year, when the world met in Cancun to discuss our collective response to climate change, the planet was a very different place. Business was starting to see the beginnings of economic recovery, nuclear energy was being seen again as an important bridge technology and our continued reliance on oil was not at the top of the agenda.

But a year later, things have changed dramatically. In Europe and the US, recovery is faltering amidst continued financial concerns. The Fukushima nuclear disaster has made governments once again nervous of nuclear and combined with the revolutions that swept across the Middle East, our continued global dependence on fossil fuels has been dramatically exposed.

In a period of a couple of months this year, every citizen finally understood the gravity of our energy crisis. We now have an irrefutable case to urgently reduce our energy use and in light of these global developments it would be irrational not to begin a major effort to renovate our energy efficiency policies and put them at the heart of our climate and energy strategies. The world needs every region to begin taking energy efficiency seriously.

So, what can we do? We can do the one thing that will reduce our need for nuclear energy and our dependence on fossil fuels. We can do the one thing that will re-launch our economies and make us all more competitive. We can do the one thing that will give us a chance to dramatically reduce carbon dioxide emissions. We can renovate our building stock, turning buildings from energy wasters to climate savers.

A WIN-WIN SITUATION

90% of the potential to reduce emissions from buildings currently lies in the existing building stock. A deep renovation of existing buildings could technically lead to a five-fold decrease in CO2 emissions and serious financial savings across the globe, in the region of US$ 120 billion. A striking figure considering that these savings would be coupled with the creation of an additional 3.5 million jobs in Europe and the US alone.

Every developed country needs to look at its building stock and needs to put in place renovation roadmaps. Emerging economies need to review their new build rules so that they don't suffer the same fate as developed countries and find themselves with a highly energy intensive and unsustainable built environment.

Durban provides another opportunity for world leaders to demonstrate leadership on climate. A real focus on energy efficiency in buildings is not only the best way to show this leadership on climate but also the best thing that can be done to restart our economies and in a way that will help deliver green growth.

Will this all be easy? Perhaps not but it is all achievable. We have an obligation to transform our current timid intentions into specific, bold action, with ambitious long-term goals and a clear pathway to achieve them. Buildings are the best place to start.

Knauf Insulation
www.knaufinsulation.com
www.renovate-europe.eu

With 30 years of experience in the insulation industry, Knauf Insulation is active in more than 35 countries with 30 manufacturing plants and over 5000 employees across the globe.

It delivers products and services in the following fields:

- Building materials and systems based on gypsum and gypsum-related products.
- Thermal insulation and sound insulation materials.
- Limestone and lime products.
- Chalk and cement related products.
- Plant engineering.

The company, which is part of the German family-owned Knauf Group, founded in 1932, had a turnover in excess of €1 billion euros in 2010.

KNAUF INSULATION
it's time to save energy

MOTHER NATURE APPROVED

Mineral wool insulation was already considered the best performing insulation material in terms of its low environmental impact. The main raw materials are sand and recycled glass, both natural and part of world's most abundant and renewable resources.

When Knauf Insulation introduced ECOSE® Technology, our revolutionary formaldehyde-free binder, we were the first to add a bio-based binder, based on rapidly renewable materials instead of petro-based chemicals. So it's safe to say our mineral wool is Mother Nature approved.

www.knaufinsulation.com

KNAUF INSULATION
it's time to save energy

with ECOSE® TECHNOLOGY

SUSTAINING SYSTEMATIC OBSERVATION FROM SPACE AT THE EUROPEAN SPACE AGENCY

The European Space Agency (ESA) supports Earth Observation Programmes on behalf of its 18 Member states. These provide vital long-term climate data and give us the technological capacity to measure geophysical variables relevant to climate. The ESA works with international space agencies through the Committee on Earth Observing Satellites (CEOS), responding to the requirements of the Global Climate Observing System (GCOS) on behalf of parties to the UNFCCC.

The Global Monitoring of the Environment and Security (GMES) Space Component programme controls our Earth Observing satellites, known as the Sentinel Series. GMES is a partnership between ESA and the European Union to provide data to support Europe's policy goals on Environment and Security for the next 25 years. Approximately 20 out of 50 of the Essential Climate Variables will be observed within the next three decades.

Figure 1

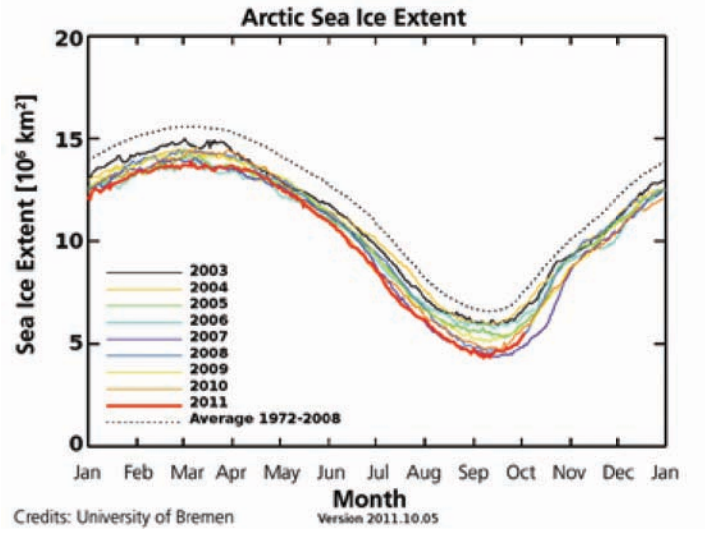
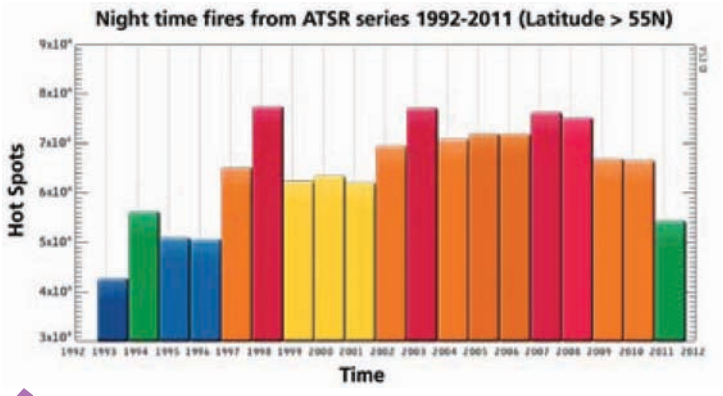


Figure 2



ESA has also started a dedicated Climate Change Initiative (CCI) that will enable scientists to access and re-analyse global satellite data archives. This programme aims to generate the most complete and consistent global records of Essential Climate Variables (ECV) possible, and make them freely available to climate research and modelling communities worldwide. It responds explicitly to the GCOS requirements.

The users of the ECV data products are the scientific, research, and (in a limited number of cases) operational organizations from the UNFCCC countries responsible for climate research, modelling, assessment and prediction within nationally and internationally funded research programmes. Many, but not all of these scientists, organizations and programmes are already users of ESA Earth Observation data products.

Figure 1: Represents the extent of Arctic sea ice over the last 10 years as measured by AMSRE. It is an indicator of the strong challenges that the Arctic is facing and suggests the northern passage could open in the future. Observing all the Arctic is only possible by satellite and a sustained global observation policy is needed from all cooperative space agencies.

Figure 2: 19 years of night fire records in the northern latitude (mainly Boreal forest) from the ATSR sensor series on board three ESA satellites: ERS-1, ERS-2 and ENVISAT. This allows scientists to understand how fire regimes are changing in time. This fire record will be used by scientists to understand fire regime change indirectly caused by climate change. It also serves to better understand mitigation and adaptation policies at regional and local levels.

In the meantime the ESA CCI will enable scientists to improve the accuracy, and consistency of global systematic measurements from Space. The time duration of the present record of these and other ECVs by using existing satellites and data archives is going to be extended for another 25 years. With these major new programmes ESA is preparing substantial contributions towards meeting the GCOS requirements, strengthening the Global Earth Observation System of Systems, and thereby supporting the overall goals of UNFCCC parties.

European Space Agency
www.esa.int

→ SPACE FOR EUROPE

The European Space Agency (ESA) is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world.

ESA is an international organisation with 19 Member States: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom (Canada takes part in some projects under a Cooperation agreement). By coordinating the financial and intellectual resources of its members, ESA can undertake programmes and activities far beyond the scope of any single European country.

ESA has been dedicated to observing Earth from space since the launch of Meteosat, its first meteorological mission, in 1977. The subsequent series of Meteosat satellites, ERS-1, ERS-2 and Envisat have been providing us with a wealth of valuable data about Earth, its climate and changing environment. We still need to know more about our planet if we are to further understand the Earth system and its processes, especially within the context of global change. This will better equip us for predicting the effects of a changing climate.

For more information, visit our web site:
www.esa.int

SHOPPING FOR EFFICIENT ENERGY MANAGEMENT

Contrary to popular belief, retail and wholesale is one of the most influential and economically significant industries across the globe. German retailer, Metro Group, explores how long-term profitable growth dovetails with a business managed in a sustainable manner.

With the creation of a dedicated Sustainability Board in 2009, **Metro Group** has institutionalised its group-wide sustainability management. The Sustainability Board recommends binding targets, guidelines, standards and measures to the company's Management Board, and in this manner furthers the sustainability strategy.

As one of the most important international retailing and wholesaling companies, Metro Group offers its customers a wide selection of products and services. However, parts of the business cause greenhouse emissions. The company's carbon footprint covers energy consumption, cooling agent emissions from refrigerant and air conditioning systems, truck logistics, paper consumption for advertising and business trips. But the company is committed to reducing its specific greenhouse gas emissions by 15% by the year 2015, compared to the base-year 2006.

Efficient energy management has been identified as one of the key levers to attain this ambitious goal. Employee training programmes and the application of modern technology are all contributing to a palpable cut in the consumption of electricity and heating. In addition, smart metering technology allows for continuous monitoring and analysis of energy usage. By the end of 2012, all Metro Group stores around the world will be equipped with the relevant systems.

BUILDINGS WITH PURPOSE

By optimising processes and through technical modernisation, Metro Group is increasing its energy efficiency. Sustainability criteria are also factored in the design of new stores and locations. A case in point is the new Fish Logistics Centre the company's sales division, Metro Cash & Carry, opened in 2010 in Germany. Here, all processes in fish logistics are bundled in one place, reducing time and cost-intensive transhipment steps and saving part of the energy and work required so far. In addition, the facility sources part of its power from self-generated wind energy and uses climate-friendly technology for cooling and outdoor lighting. The building design and workflows of the new logistics centre received the silver status for temperature-controlled real estate property of the German Quality Seal for Sustainable Building.

Keeping groceries at a prescribed temperature at all times is the key to providing customers with fresh and safe products. Due to their relatively high electricity consumption, refrigeration systems contribute significantly to Metro Group's carbon footprint. By using closed units, the company manages to reduce refrigeration loss and energy consumption. In numerous Metro Cash & Carry stores, it has installed walk-in cold rooms, where food is cooled through an air-conditioning system. This allows for a 30% reduction of cooling-related power usage.

Metro Group, one of the largest and most international retailing companies, is based in Düsseldorf, Germany

With operations in 33 countries and over 2,100 outlets, the company caters to the needs of millions of people every day.

The Group's performance is based on the strength of its sales brands which operate independently in their respective market segment: Metro/ Makro Cash & Carry – the international leader in self-service wholesale, Real hypermarkets, Media Markt and Saturn – European market leader in consumer electronics retailing, and Galeria Kaufhof department stores.

THE CLIMATE PROTECTION GOAL

Improvements in energy management had a positive impact on Metro Group's carbon footprint. In 2010, specific CO2 emissions were reduced by 3% to 326 kg per square metre of selling space, compared to 336 kg per square metre in the year 2009. The company's long-standing commitment to climate protection has received a positive reception. In its latest report, the Carbon Disclosure Project (CDP), the world's largest investor-led climate protection initiative, praises Metro Group for its exceedingly transparent carbon accounting. This makes the company eligible for inclusion in the CDP Germany 200 Carbon Disclosure Leadership Index.

Metro Group
www.metrogroup.de

METRO GROUP
MADE TO TRADE.

BBDO
proximity

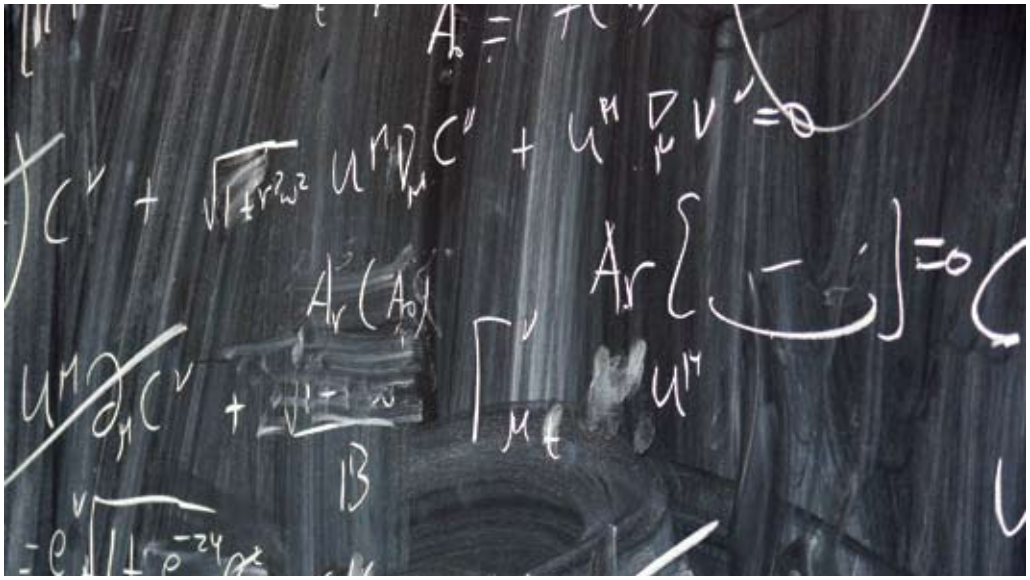
WE CHANGE THE WORLD. JUST TO LEAVE IT AS IT IS.

SHARE OUR VISION OF GREEN TRADE.

We are an important player in the trading world – with important responsibilities. Sustainability is one of our key concerns. That is why, amongst other measures, we are aiming to reduce METRO GROUP's carbon footprint by 15 percent by 2015. And that's just the beginning. We are shaping the world of tomorrow – not with words, but with actions. To find out more, please go to **www.metrogroup.de**

METRO GROUP
MADE TO TRADE.

METRO real,- MediaMarkt SATURN GALERIA



Learning: Back to the future.

Of all the roads to a brighter future, education and research is perhaps the most important. Schools and Universities play a vital role in developing new low-carbon technologies, working on innovative mitigation policies and teaching tomorrow's political leaders how to care for their planet.

Find out more at: rtcc.org/learning

RTCC
Responding to climate change

INTEGRATING STRENGTHS FOR A SUSTAINABLE ENERGY SYSTEM

Thin-film solar cells built at The Ångström Solar Centre, www.asc.angstrom.uu.se

"At Uppsala University we recognise that the challenges facing our planet in the coming decades can only be solved by integrating the strengths of different perspectives."

A long-term sustainable energy supply can only be achieved by embracing all aspects of the energy system.

Innovative technical solutions must be environmentally sound and socially applicable. A sustainable energy system requires advanced science and technology. It also demands we explore the effects of various forms of energy on our natural resources and economic development. The influence of public policy and economic incentives are important factors that affect an energy system. Furthermore, energy issues have clear ties to geo-political conflicts, conflict resolution and democracy.

Collaboration is a common theme as we contribute to knowledge and innovation in response to climate change, natural resource depletion and energy crises. This spirit is reflected in a growing number of interdisciplinary research and educational programmes within the University, and in collaboration with other Swedish and European Universities and Research Institutes.

A selection of collaborative efforts in research and education are:

STRATEGIC INITIATIVES

StandUp for Energy: *An energy research alliance for the future* – Collaboration between Uppsala University, The Royal Institute of Technology, The Swedish Agricultural University (SLU) and Luleå University of Technology. This partnership is a result of the Swedish Government's commitment to high quality research in areas of strategic importance. The overriding aims of the StandUp partnership are to reduce the costs of renewable and environmentally sustainable electricity, and to develop more cost-effective and energy efficient hybrid and electrical vehicles. The technical developments have to be addressed from a systems perspective. This involves integrating the environmental and social impact of new technologies. Such a systems approach will influence all research and development efforts to focus on sustainable technologies that benefit society and can be implemented in industry.

INTERDISCIPLINARY RESEARCH

The Uppsala Centre for Sustainable Development (CSD) – Established in 2007 as a collaboration between Uppsala University and SLU to conduct and promote interdisciplinary research on sustainable development with a global perspective. Targets include natural resource management, global patterns of consumption, production and trade, relations of poverty and power, climate change and security and questions of civil society, citizenship and rights. The Centre also hosts two large research networks that organize critically reflecting conferences and seminars on these issues, attracting both Swedish and international participants.

The **Baltic University Program** is a network of more than 190 universities and other institutions for higher education throughout the Baltic region. It is coordinated by a secretariat at Uppsala University.

Uppsala Water Centre works to ensure that our unique expertise on water supply issues is applied to meet society's needs.

The Global Energy Systems Group focuses on the issue of resource physics, especially concerning the availability and production of fossil fuels, but also explores resource usage in society and socioeconomic development from a resource perspective.

About Uppsala University

Founded in 1477, Uppsala University is the oldest university in Scandinavia. World-class research and first-rate education of relevance to society, the business sector and the arts make Uppsala University one of Northern Europe's most highly ranked and one of the hundred finest in the world. Its schools include science and technology, medicine and pharmacy, social sciences and humanities.

JOINT EDUCATION

Collaborations between Uppsala University and the Swedish Agricultural University:

Energy Systems Engineering – Provides a comprehensive view of processes for raw material supply and energy production, energy conversion and distribution. Students specialise in modern energy technology and the social and environmental impacts of energy systems.

Environment and Water Engineering – An interdisciplinary programme that provides our engineers with competence for developing total solutions for environmental and water technology problems.

Masters in Sustainable Development – An interdisciplinary programme that analyses sustainable development from many different perspectives, from economy and politics to engineering solutions.

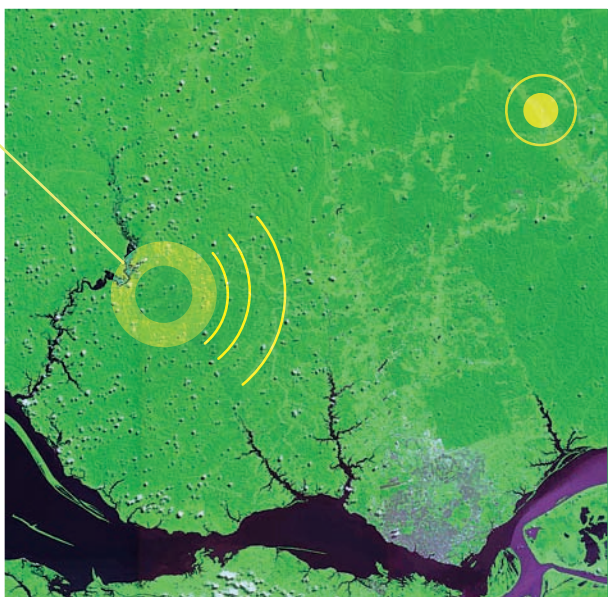
Uppsala University
www.uu.se

UPPSALA UNIVERSITET

YOUNG INVESTIGATORS AWARDS in São Paulo, BRAZIL

FAPESP, the São Paulo Research Foundation, is one of the main research funding agencies in Brazil. With a budget of US$ 450 million, it supports more than 11,000 scholarships and 8,000 research awards. FAPESP's Young Investigators Awards envisage creating new research groups led by highly promising early-career scientists in any field of knowledge and from any country. Selected candidates receive competitive fellowships and sizable research funds. Candidates are encouraged to develop their projects with higher education and research institutions from the State of São Paulo, Brazil. Highlighted research areas are: biodiversity, bioenergy, climate change, neurosciences, cancer, urban studies, materials science, optics and photonics, urban studies and violence. Proposals in other fields will be considered and all will be selected through a peer-reviewing process.

For guidance and further information: yi@fapesp.br
Additional information: http://www.fapesp.br/en/materia/4479



SPEEDING UP THE PACE OF RESEARCH IN BRAZIL

Boat stuck in the Manacapuru lake in the Amazon in the drought of 2010

Research on climate change has been developed in São Paulo, Brazil for at least the last 15 years, and is now entering a new era, reports the São Paulo Research Foundation.

In 2008, the Foundation established the FAPESP Research Programme on Global Climate Change (FRPGCC) to advance the understanding of the consequences of global climate and environmental changes in the state. In the first round of selected research proposals, FAPESP has invested US$33 million, including the acquisition of a 15 Tflop supercomputer devoted to global climate modelling and an oceanographic vessel.

The Programme includes 19 research projects that will last up to six years. One of its major goals is to launch, by 2013, a Brazilian Model of the Global Earth System, with a focus on regional interests such as the Amazon and the South Atlantic.

The Programme has both observational and modelling components, including the recovery and expansion of regional and paleoclimatic observations. This is crucial to overcome the lack of quality environmental observations for research, an enormous obstacle to the scientific progress so far.

It will have a substantial technological component, not merely concerning innovative technologies for the mitigation of emissions, but also technologies for adaptation in all sectors and activities, given that the degree of climate change has now become inevitable. The Programme shall also include a research component on the science and climate policy interface.

PROPOSALS FOR RESEARCH

The FRPGCC considers proposals which fall within the scope below, but research in other areas related to climate change may be submitted provided they connect to the Programme and its objectives.

a) Consequences of global climate change in the functioning of ecosystems, with emphasis on biodiversity and the water, carbon and nitrogen cycles.
b) Balance of radiation in the atmosphere, aerosols, trace gases and changes in land uses.
c) Global climate change and agriculture and livestock farming.
d) Energy and greenhouse gas effects: emissions and mitigation.
e) Climate change and effects on human health.
f) Human dimensions of global climatic changes: impacts, vulnerabilities and social and economic responses, including adaptation to the climate changes.

Two significant programmes supported by FAPESP are firstly BIOEN, aimed at articulating public and private R&D, using academic and industrial laboratories to advance and apply knowledge in fields related to ethanol production in Brazil. Secondly, BIOTA was created in March 1999 and aims to discover, map and analyse the origins, diversity and distribution of the flora and fauna of the State of São Paulo, and also evaluate the possibilities of sustainable exploitation of plants or animals with economic potential and assisting in the formulation of conservation policies on forest remnants. The BIOTA-FAPESP Programme has drafted two maps which identify conservation areas based on 151,000 records of more than 9,000 species. Fourteen government decisions are included in the São Paulo legislation for conservation of threatened biomes.

The Foundation expects that the results of the research projects, and the entire Programme, will assist in scientifically orienting decisions and policy within Brazil and worldwide.

São Paulo Research Foundation
www.fapesp.br/en/

The São Paulo Research Foundation is one of the major funding agencies for scientific research in Brazil. It supports research in all fields of knowledge in the State of São Paulo. Since its creation in 1962, FAPESP has granted 105,000 scholarships and fellowships from undergraduate to postdoctoral studies and provided financial aid to 92,000 individual and thematic research projects. In 2010, FAPESP's expenditure was around US$500 million. All research proposals received are peer reviewed and the foundation works in close contact with scientific researchers towards the organisation of new special research programmes.

NEW VISIONS FOR NEW CHALLENGES

Climate-KIC is one of three Knowledge and Innovation Communities designated in 2010 by the European Institute of Innovation and Technology (EIT). The priority area which KIC addresses is climate change mitigation and adaptation.

Climate change mitigation and adaptation require a global economic and societal transformation comparable to the industrial revolution. Existing markets will be radically altered and new ones created across a variety of sectors. Climate-KIC's mission is to significantly accelerate and stimulate the innovation required to this transformation and ensure Europe benefits from it through technologies, companies and jobs. Our vision for accomplishing this is to create together a strong community of world class companies, researchers and students that work closely together to solve a well-defined and carefully selected subset of the most important climate change innovation challenges, to create technologies and ventures to capitalise on those innovations for Europe.

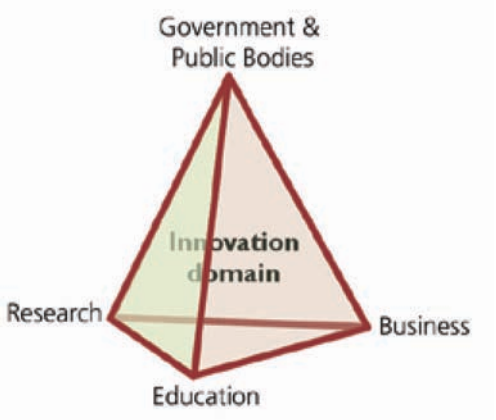
CLIMATE-KIC VISION

Climate change mitigation and adaptation present not only a formidable societal challenge; they also offer huge innovation and business opportunities. Our vision is as follows:

- To lead the world toward low-carbon prosperity – Climate-KIC will help innovators capitalise on new business opportunities driven by Europe's first mover response to climate change.
- To create an emerging climate-change innovation space – Climate-KIC will build the critical mass and forge alliances among existing businesses and new businesses with the aim of creating partnerships that jointly cover all elements of emerging value chains.
- To capitalise on public-private synergies to induce innovation – Climate-KIC will help governments and public agencies to develop effective policy frameworks and to pioneer early introduction of climate change products and services in collaboration with the private sector.

The pyramid in Figure 1 shows the four actors in Climate-KIC, education, research, business and the public sector. Together these actors define our innovation domain and

Figure 1



provide the push and pull necessary to get useful climate innovation into the markets.

To sharpen the focus of our innovation and education activities, we have refined our approach into three integrated KIC value propositions or pillars: Innovation and Pathfinder, Education and Entrepreneurship. These pillars are interdependent, closely integrated and form the basis of our Climate-KIC enterprise.

INNOVATION AND PATHFINDER

These projects are key to our success since they rally companies, cities and academic institutes around delivery of new products and services and provide bridges between our other pillar activities. We have selected four initial themes: assessing climate change and managing its drivers, low-carbon production systems, adaptive water management and transitioning to resilient low-carbon cities.

EDUCATION

The Climate-KIC education programme is based on the premise that innovation and entrepreneurship are crucial to generate sustainable economic growth, competitiveness, and societal well-being. It acknowledges that the capacity to develop ideas and new technologies into commercial opportunities requires a unique toolset and cognitive mindset, and that future climate innovators and entrepreneurs need a broad range of skills to become agents of change.

ENTREPRENEURSHIP

The five Co-Location Centres (in Switzerland, Germany, the Netherlands, France and the UK), together with the Regional Innovation and Implementation Communities (RICs) offer support to the wider climate entrepreneurs' community by providing shared space and research facilities for diverse teams from business, academia and public sector. To ensure effective use of funding, CLCs fully leverage existing entrepreneurship, aspiration activities, courses, facilities (including incubators) and structures (TTOs).

For Climate-KIC to be effective it must have influence beyond its own activities. Our ambition is two fold: systemic innovation and trained innovators. Our hope is that Europe and its regions can lead the world in climate innovation.

Climate-KIC
www.climate-kic.org

Global COE Program

Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions

DPRI and RISH, both located in the Uji Campus of Kyoto University, and the five Graduate Schools (Science, Engineering, Agriculture, Informatics, and Global Environmental Studies) have established a new "educational unit" in April 2010 that integrates science/engineering and humanities/sciences, to foster talented individuals at the graduate school level by going across the boundaries between disciplines.

The students who complete this program are expected to take leadership in domestic/international societies as top-level researchers/educators, local elites/decision-makers, and international elites.

DPRI: Disaster Prevention Research Institute, RISH: Research Institute for Sustainable Humanosphere.

Objectives of this program are as follows:

1. Promoting research and education to *reduce vulnerability and enhance adaptability of a society* toward environmental change and disasters caused by abnormal weathers that frequently occur
2. Pursuing adaptation measures that fit local situation, climate and culture, instead of countermeasures imposed by developed countries - "*contributing to a harmonious coexistence within human and ecological community on this planet*" - a mission of Kyoto University
3. Preparing for future disasters - prior investment in disaster prevention, adaptation management, and human resources: "*Invest today for a safer tomorrow*" (UNISDR)

Educational Unit for Adaptation and Resilience for a Sustainable Society (GCOE-ARS), Center for the Promotion of Interdisciplinary Education and Research (CPIER), Kyoto University

Address: Kyoto University Uji Campus, Gokasho, Uji city, Kyoto, Japan 611-0011
Web: http://ars.gcoe.kyoto-u.ac.jp/ **Phone:** +81-774-38-4643
Fax: +81-774-38-4642 **Email:** secretariat@ars.gcoe.kyoto-u.ac.jp

THE WAY TO BUILD A RESILIENT SOCIETY

Even if we were to immediately stop the current increase of emissions of greenhouse gases (such as carbon dioxide), it is impossible to curtail their detrimental outcome on our global climate. The lasting effects from our present industrial activities will continue for several decades especially in the Asia, Africa and Pacific region. How then are we to cope with the anticipated catastrophic events from resulting extreme weather and water conditions?

A new interdisciplinary survivability science is necessary, because single disciplines cannot solve the complex issues arising from global environmental change including climate change. Africa, Asia, and the Pacific have many unsolved scientific issues brought by strong solar radiation, abundant water vapour and their variation in time and space, which cause extreme weather and hydro-meteorological conditions such as tropical storms and floods.

Kyoto University, in order to confront these crucial problems has created an interdisciplinary graduate Educational Unit at its Global COE (Centre of Excellence) Programme, managed by the Japan Society for the Promotion of Science with financial support from the Ministry of Education, Culture, Sports, Science and Technology of Japan.

The Educational Unit is composed of Kyoto University's five graduate schools (Global Environmental Studies, Science, Engineering, Informatics and Agriculture) and two research institutes: Disaster Prevention Research Institute (DPRI) and the Research Institute for Sustainable Humanosphere (RISH), which have many international researchers and advanced research facilities, as well as overseas partner organisations.

This will produce young world leaders from many countries, who will have the expertise in the environment and disaster management to deal with global climate issues in the coming decades.

There are urgent social needs for human development and application of really practical, proper adaptation measures. Many vulnerable societies are suffering from insufficient adaptation capacity and resiliency against extreme weather, natural disasters and environmental changes. It will take a long time to implement capacity building in human resources and improve adaptation to extreme weather and related water and environment disaster events through on-the-job training, internship opportunities, and intensive interdisciplinary lecture series.

Kyoto University
http://ars.gcoe.kyoto-u.ac.jp

Kyoto University, established in 1897, is the second oldest national university in Japan. This top-level, research-oriented university has so far produced seven Nobel Prize winners in various scientific fields.

Based on the assessments of the 21st Century COE Programme and verifications of its results by Japan's Ministry of Education, Culture, Sports, Science and Technology, the Global COE (Centres of Excellence) Programme was established.

The programme provides funding support for establishing education and research centres at the apex of global excellence to elevate the international competitiveness of Japanese universities. It will strengthen and enhance the education and research functions of graduate schools to foster highly creative young researchers, future world leaders in their respective fields from experiencing and practising research of the highest world standard.

CUT, AN ENGAGED UNIVERSITY OF TECHNOLOGY

Central University of Technology, Free State (CUT) is the foremost higher education institute in the heart of South Africa, dedicated to quality teaching of science, engineering and technology. Over the past 30 years CUT has developed into a leading establishment able to take its rightful place on the national and international stage.

CUT has a vision that by 2020 it will be a university that focuses on producing quality social and technological innovations in socio-economic development. In his recent address to the media Vice-Chancellor and Principal, Professor Thandwa Mthembu said: "We have to build competitive advantages on the basis of our location; its uniqueness and the resources it has. We want to see the central region become a centre of focus for both social and technological innovations so that the world looks to this region for solutions". He added: "Our focus has always been on innovations which are intended to improve the development of the region."

The legacy of South Africa's past calls both for leadership from the government, and for universities to be proactive in areas of social and technological innovation.

CULTURE OF INNOVATION

CUT is proud to be associated with the RTCC 2012. It is an important forum for emerging global trends and illustrates CUT's contribution to these challenges. As a university of technology, CUT has a critical role to play in support of the ongoing global warming discourse and its impact on the environment, as well as in shaping a better future for generations to come.

While the impact of climate change is by no means unique to the central region, CUT is committed to building partnerships with various institutions to enable the University to develop technologies that can be used to lessen the impact of global warming in the central region, South Africa and the rest of the continent.

CUT is currently exploring sustainable sources of heat generation. Units such as the Centre for Rapid Prototyping and Manufacturing (CRPM), the Product Development Technology Station (PDTS) at CUT are widely recognised for their research as well as their unsurpassed ability to design, develop and manufacture products at a fast and cost effective rate. CUT is the only university of technology accepted as a full member of the newly established National Medical Device Innovation Platform (MDIP). In addition our Faculty of Health and Environmental Sciences does important research into Waste Management and offers training to the Free State and neighbouring provinces.

As part of the Vision 2020 strategic trajectory, CUT undertook a campus-wide sustainable development project. In June 2011 CUT won a joint UNESCO award for promoting sustainable development through education, research and collaborations with Aalen University of Applied Sciences from Germany. The University remains committed to promoting the involvement of communities through community engagement initiatives and finding sustainable solutions to varied challenges facing humanity.

OUTSTANDING RESEARCH

This year, the institution celebrates its 30th year of technological innovations – and our 2020 vision provides a path to greater achievements yet. We are investing in success: CUT appointed six research professors in 2010. This milestone is a reflection of the university's pursuit of quality education and academic excellence. In our efforts to educate, teach and train students with the latest world class technologies, we are committed to customer service, excellence, innovation, integrity and diversity. These values are a hallmark of what CUT stands for: We are always thinking ahead!

Central University of Technology
www.cut.ac.za

Central University of Technology, Free State (CUT) is the foremost higher education institution in the heartland of South Africa, dedicated to quality education and training in science, engineering and technology. Over the past 30 years the CUT has developed into a leading institution able to take its place in the national as well as international higher education landscape.

Students observe a waste spill management exercise at Enviroserv facilities

Celebrating 30 Years of Technological Innovation
Soaring to 2020

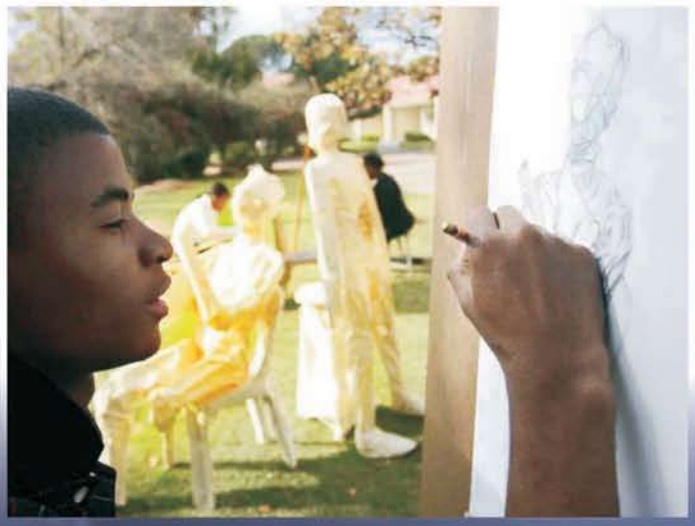
Central University of Technology, Free State

Central University of Technology, Free State

Celebrating 30 Years of Technological Innovation
Soaring to 2020

Our Vision 2020 statement states that by 2020, Central University of Technology, Free State, shall be an engaged university that focuses on producing quality social and technological innovations in socio-economic developments, primarily in the central region of South Africa.

Faculty of Engineering and Information Technology



Faculty of Humanities

Faculty of Management Sciences

Partners explore CUT's state-of-the-art research and manufacture facilities.

Faculty of Health and Environmental Sciences

Be **practical.** Choose your **future.** Make the **right choice.**

Thinking Beyond

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MEETING THE CHALLENGES – AN ACADEMIC APPROACH

The Universidad Autónoma Metropolitana (UAM) explains how it is making the paradigm of sustainability a reality, including adopting principles and good practices compatible with the urgent imperative to fight climate change. In order to achieve this, the university is following two complementary strategies. One, to accelerate and expand the implementation of sustainable practices across teaching, research, outreach and environmental management within existing programmes and campuses. Two, it aims to use this expansion to integrate the best sustainability practices and technologies into its operations.

SUSTAINABLE PRACTICE AND UNIVERSITY LIFE

Its key criteria to achieve a higher degree of sustainability are:

- Adoption of a culture for sustainability.
- Strengthening of teaching programmes that relate to sustainability.
- Strengthening of research projects in the field.
- Creation of, and participation in, national and international networks devoted to sustainability.
- Implementation of good environmental management practices such as efficient use of water and waste, garden upkeeping as well as efficient energy use. All the above has been complemented with campaigns to raise awareness and strengthen the culture of sustainability.

HOW INTEGRATION WORKS

Radical changes in the design and functionality are being incorporated into the construction of the two new campuses, Cuajimalpa and Lerma. A number of state-of-the-art high-efficiency and low-carbon technologies will be installed in both campuses.

Some of these efforts carry higher costs than the costs of traditionally less efficient (business-as-usual) technologies. The university will apply internationally accepted methodologies to estimate the environmental and social benefits associated with these more sustainable and less carbon-intensive technologies. They are seeking financial support to cover incremental costs from the Global Environmental Facility and aiming to register their projects to obtain carbon credits from the Clean Development Mechanism established by the UN Climate Convention.

The Universidad Autónoma Metropolitana (UAM) was the first Mexican university to offer an undergraduate degree in Environmental Engineering in 1974. Masters and Doctoral programmes in the field have been offered for over a decade.

Nowadays, UAM is engaged in an ambitious effort to expand the offer of high-quality public education in Mexico City, with construction of the fourth and fifth campuses just started. This endeavour is not just about developing the faculty, alumni and infrastructure, it is also an opportunity to reflect on accomplishments and shortcomings, to ensure UAM adequately responds to the new era's emerging needs and trends.

Some of the prominent projects that will be included in the two new campuses are:

- State of the art landscape architectural design.
- Extensive green areas including some parking roofs.
- Highly efficient lighting of classrooms, parking lots and outdoor areas.
- In-campus rain water collection, water treatment and water reuse.
- Waterless urinals.
- Solar water heaters for sports facilities.
- Photovoltaic systems for electricity generation.
- Highly efficient insulation materials for classroom walls.

Universidad Autónoma Metropolitana
www.uam.mx

Casa abierta al tiempo
UNIVERSIDAD AUTÓNOMA METROPOLITANA

APPROACHES TO ACHIEVING SUSTAINABILITY IN ACADEMIA			
Activity	Systemic thinking	Ethical approach	Participatory & related planning
Education	Classes and cross subjects	Professional responsibility	Students co-responsibility in teaching learning process
Research	Disciplinary research	Research on social equity participation	Researchers' commitment to create a sustainability culture
Extension	Interdivisional projects	Social work in communities	Urban sustainable development impulse
Management	Integral management system	Benefits of community management programmes	Active participation of communities in management programmes

Towards a sustainable University

UNIVERSIDAD AUTÓNOMA METROPOLITANA

Casa abierta al tiempo

Mexico City

www.uam.mx

ACADEMICS TAKE UP THE METHODOLOGICAL BATON ON INVENTORIES

The International Panel on Climate Change (IPCC) has said that many climate change impacts can be curbed, delayed or avoided through appropriate mitigation measures. What we need are ad hoc methodologies in order to quantify emissions on a small, but significant, scale. Firstly, we need to identify all the sources and types of emissions and then apply the appropriate methodology.

The Consejo Consultivo de Cambio Climatico de Mexico has said it is time for Mexico to go beyond the threshold of good intentions and start implementing mitigation measures on a large and small scale (for example small businesses and university campuses), since we should all contribute to tackling global warming.

The Tecnologico de Estudios Superiores de Ecatepec (TESE) in Mexico has been working on this for their university campus. They have developed an improved hybrid methodology for an inventory for greenhouse gases (GHG), designed for application in a public higher education campus.

The first obstacle to this was that accurate methodologies for small-scale inventories did not exist. Inventories have typically been the responsibility of regional and national organisations. Consequently, TESE started with learning from the large-scale methodologies, investigated similar examples worldwide and consulted with lecturers and students.

PART OF A GREATER SCHEME

The resulting methodology combines methods from the Association for the Advancement of Sustainability in Higher Education (AASHE) and the Greenhouse Gas Protocol. It can be adopted across universities and consortiums. In Mexico, universities can contribute their voluntary emissions commitments to the National Communications to the United Nations Framework Convention on Climate Change (UNFCCC) which the country regularly presents as a non-Annex I party.

When the methodology was applied to 2010 data in the TESE campus, they found that over 80% of GHG came from indirect emissions. In detail, most greenhouse gases emitted in the campus come from electricity consumption in buildings and from students-faculty transportation.

The next stage set out the mitigation measures. These included rational electricity use in campus facilities, incorporating sustainable designs in future constructions, planning a collective transportation system for students and lecturers and limiting air travel. The wider influence of these measures could include a transportation service from home to campus, classroom and office sensors to control the lights and environmental awareness campaigns.

TESE is confident these measures will help dramatically reduce their carbon footprint, and hopes this extends across universities and higher education institutions. Better dialogue between universities and other education institutions will raise awareness of climate change and its impacts. To this end, TESE authorities are in touch with the National University Association and other Higher Education Institutions.

The doesn't stop there – the TESE research group is continually looking for new campus initiatives to mitigate GHGs and curb global warming.

The Tecnologico de Estudios Superiores de Ecatepec
www.tese.edu.mx

The Tecnologico de Estudios Superiores de Ecatepec, was created on 10 September 1990, as a decentralised public institution of the State of Mexico. Currently it has over 5,000 students in the following programmes: Electronic Engineering, Mechanical Engineering, Chemical Engineering, Biochemical Engineering, Computing Systems' Engineering, Industrial Engineering, Mechatronical Engineering, Accounting B.A., Computer Science B.A., Masters in Sciences in Chemical Engineering, Masters in Sciences Biochemical Engineering, Masters in Sciences in Mechatronical Engineering and Masters in Engineering in Computing.

KEEP YOUR WITS, AND BUILD A SUSTAINABLE FUTURE

We are in a period of unprecedented human-induced environmental changes with unknown rates and capacity of Earth system response. The University of the Witwatersrand (Wits) is committed to developing its research intensity, championing good researchers and supporting world class research that addresses local questions in a global context. Global change, including climate change, is an area of strength at Wits and a priority area for its research strategy.

The Global Change and Sustainability Research Institute (GCSRI) has recently been established with secure funding. This new Institute is structured in a way that will facilitate and enhance multidisciplinary research by creating research platforms that can optimise on the capacity and draw on competences vested in the faculties and schools across the university. A large postgraduate school is at the heart of the Institute. Through a coordinated approach facilitated by the Faculty of Science and involving several research units and groups located across the university a plan has been developed for Wits to be a leading platform for Global Change Science, with focus areas that coincide closely with the knowledge challenge areas identified by the National Science Agenda.

BUILDING ON EMERGING TRENDS

The Institute offers a unique opportunity to develop solutions not just with a local impact, but with a global reach for many similar situations. Through the work of Wits' researchers over many decades the University has access to very long datasets enabling the ability to look backwards in order to look forwards. These data include themes such as earth sciences and climatology; vulnerability and resilience; biodiversity; health and demographic surveillance; remedial/preventative chemical and energy conversion technologies; alternative energy sources; and atmospheric aerosols, pollutants, dispersion and deposition.

This long-standing strength is complemented by recent efforts to build strength in innovation studies which includes a focus on adaptation and resilience for developing a scientific basis for understanding how human societies can shift from current socio-economic systems to more sustainable ones. There is growing diversity within the innovation studies field and some key trends are emerging, including an increased focus on interaction between environmental considerations and the social-shaping of technological and innovation patterns and outcomes.

The insights and evidence produced as part of the research programme are significant for social and economic development and will involve direct engagement with policymaking institutions by providing evidence based inputs to policy processes, including measurement of innovation. In this framework, innovation is considered to play a critical role in decoupling economic growth from environmental pressures.

The research conducted in this new Institute takes the view that knowledge generation, technology, behavioural change and innovation all play important roles in finding approaches and solutions to global change and sustainability issues. This research is directly relevant and important for improving the quality of life in South Africa. Building knowledge of the impacts of global change will have significant and direct societal implications by improving understanding of how best to mitigate and adapt to the social implications of global change/climate change.

University of the Witwatersrand, based in Johannesburg, founded in 1922, is one of only two universities in Africa ranked in two separate international rankings as a leading institution in the world.

It is home to 15 South African Research Chairs, seven research institutes, 20 research units, 10 research groups, three Centres of Excellence, more than 200 rated scientists, of which 14 are A-rated.

The origins of Wits lie in the South African School of Mines, which was established in Kimberley in 1896 and transferred to Johannesburg as the Transvaal Technical Institute in 1904, becoming the Transvaal University College in 1906 and renamed the South African School of Mines and Technology four years later.

University of Witwatersrand
www.wits.ac.za/GCSRI

photos © BFN Erasmus at WITS

HERE COMES THE A HI FAMBENI!

The idea of a modern tricycle was born in 2009 with an initial concept for a low cost "future vehicle" suitable for small businesses in rural South Africa. The concept became a reality in August 2010, with the launch of a hydrogen fuel cell powered tricycle designed and developed by students at the Soshanguve Campus, Tshwane University of Technology, a first for South Africa as well as any higher education institution.

One might think that a tricycle hardly qualifies for a new concept in travelling or motor engineering, but this is no ordinary machine. This project was done under the mentorship of the world renowned SA designer Pierre Terblanche who for ten years was Chief Designer at Ducati. The bicycle was developed by TUT in partnership with the Department of Science and Technology and Hydrogen South Africa (HySA), and is a prototype of a rural transport system.

The *A hi fambeni's* 250 W motor is powered by a high temperature (HT) hydrogen fuel cell. In addition, the hydrogen used is neither compressed at 700 bar not cryogenically liquefied; it is stored at a safe 5-30 bar in a tank filled with metal hydride powders.

The vehicle was launched just eight months from its inception. From the outset, the target was to have a "realized concept" ready for the second annual RETECZA conference, which was held in August of the same year. RETECZA is the Resource Driven Technology Concept Centre for South Africa, a public-private initiative formed by the Department of Science and Technology, the Tshwane University of Technology (TUT), the Georgia Institute of Technology, the Next Generation Vehicle Consortium and a group of South African companies.

The project began in early December 2009 at the Soshanguve South Campus when a group of students produced an initial concept for a three wheeler. The lecturers and mentors were happy with the concept. At this stage, Pierre, who just completed a Motto Guzzi commission offered his service almost free of charge, to assist with the aesthetic part of the "bike".

To get into the bigger picture of what the students had in mind, Pierre was taken to view the traditional South African ice cream vendors who make use of similar tricycles. The tricycle the students had in mind was to be built using the basic sub-frame, motor and drive controller of an Arpillia Enjoy electric assist bicycle.

When putting the idea on paper a more aesthetic design was developed by making a mock-up, providing for the fuel cell and hydrogen gas canister. The mock-up was completed close to the end of 2009 and a prototype with all of the body panels and layout was launched at the University of the Western Cape early 2010.

One of the most significant reasons for using an HT fuel cell is that they have a pre-heater that warms the permeable membrane to above 80^0 C to initiate the reaction. This has a distinct advantage over the low temperature equivalents in that no additional humidification is required to prevent evaporation of the water used as an electrolyte. Adding to this is the fact that HT fuel cells are also less susceptible to contamination.

The result of using hydrogen fuel cells with this tricycle is a "vehicle" with 3-5 hours of operation under power off 100g of hydrogen stored in a 2.6 litre tank – and pedals in case the hydrogen should run out. This is a small beginning of something bigger to come; hydrogen is here to stay and this project demonstrated the use of a zero emission mobility solution for use in rural areas.

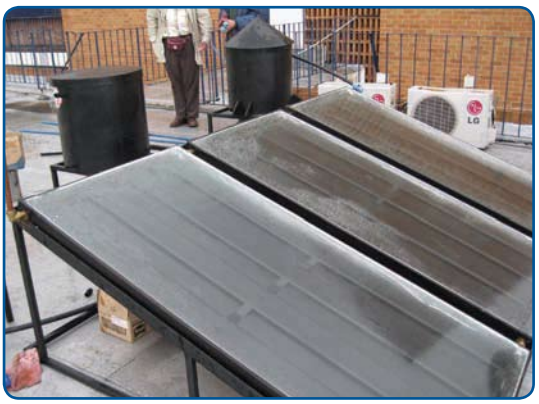
Tshwane University of Technology
www.tut.ac.za

Tshwane University of Technology
We empower people

Tshwane University of Technology

We empower people

Energy and the Environment; TUT contributes towards saving our planet



Energy use and supply is of primary importance to society and has made the greatest impact on the environment of any human activity. The focus to save our planet is no longer only on extraction, transport or noxious emissions; it has widened to cover global issues such as acid rain and the greenhouse effect.

At the Tshwane University of Technology, numerous research projects contribute towards saving the one planet we have. Some projects include:

The next generation vehicle

In 2010 TUT unveiled a South-African designed and built working concept of a hydrogen powered tricycle. What began as a low cost future vehicle suitable for small businesses in rural South-Africa, has all the potential to change ideas on travelling and transport. The *A hi fambeni 250* W motor is powered by a high temperature hydrogen fuel cell, stored at a safe 30 bar in a tank filled with metal hydride powders.

The development of a solar power plant

Solar power plants could form part of the solution in the near future in South Africa to create additional power which is much needed by industry, households and communities at large.

The development and evaluation of solar desalination technology for lentic and lotic water bodies

Water is essential to sustain social and economic growth. Predictions suggest that South Africa would have a serious water allocation in the very near future. As a result groundwater is increasingly being utilized especially for rural supply and irrigation.

Retrofitting of governmental office blocks in Pretoria to reduce energy consumption

A notional building will be constructed from a survey of ten of the Department of Public Works buildings, based on a typical building typology. This notional building will then be benchmarked regarding the energy consumption such as lighting, HVAC, ancillary services and equipment. A thermo modelling will then be used to determine the effectiveness of the proposed interventions to reduce energy consumption.

Research projects such as these aim to alleviate poverty and ensure sustainable livelihoods in South Africa via a vibrant culture of cutting edge research, innovation and technology concept development; with one important characteristic: never forget that there is only ONE planet to live on

RESEARCH NOW EQUATES TO SURVIVAL NOW

Mitigation actions are essential, but present conditions are so critical, adaptation is a question of short-term survival. Mexican Institute, the Instituto Politécnico Nacional (IPN) reveals some of their projects across both of these areas.

Most immediately, coastal areas are affected by the unprecedented sea-level rise. Key research is investigating the impact of changes in sea level on lagoons, and therefore in fishing. The significance of this study will be reflected in the management of the economy and human settlements in the coastal and island areas. Potential rises in global sea-levels are an international concern because of the expected effects on coastal areas, such as coastal erosion, flooding of low-lying lands and salinisation of rivers, bays and groundwater tables, phenomena that can affect human settlements as well as economic activities, causing massive economic damages.

Increasing urbanisation has a critical impact on climate change. In the Institute, several studies are currently underway to establish adaptation actions such as hurricane-resistant houses, prevention of urban heat islands through urban planning which also diminishes potential heat health risks.

SEARCHING FOR FOOD SECURITY

Hydric stress is a serious problem in several regions worldwide and Mexico is not an exception. The global change in climate has forced an increase in air temperature, drought and flooding, resulting in a critical decrease of water availability in certain regions. When low water availability reaches a certain threshold, plants slow or stop growing.

This is a critical point which should be taken into account in any strategy to avert a food crisis and recover degraded soils and desert areas. Research from IPN is developing biotechnological projects which study the genetic variants of plants resistant to drought and salinity. Some of these plants will seed in semi-arid, saline or degraded soils. These plants are not changed genetically and are actually natural genetic variations. Results of these projects could be considered in alimentary security management.

Unquestionably, burning fossil fuels causes CO2 emissions to the atmosphere, accelerating global warming and consequently climate change. A worldwide mitigation strategy and accompanying targets needs to be established and followed. IPN is focusing efforts on developing technologies, such as renewable energy, which make this possible. One option is the use of solar energy. Institute scientists are designing and constructing an urban concentration solar stove – an innovative proposal. With flat reflectors and a heat-accumulating tank, it allows high temperatures of up to 500 degrees Celsius. The stove can be used night and day and during cloudy periods – it lasts for seven days without recharging.

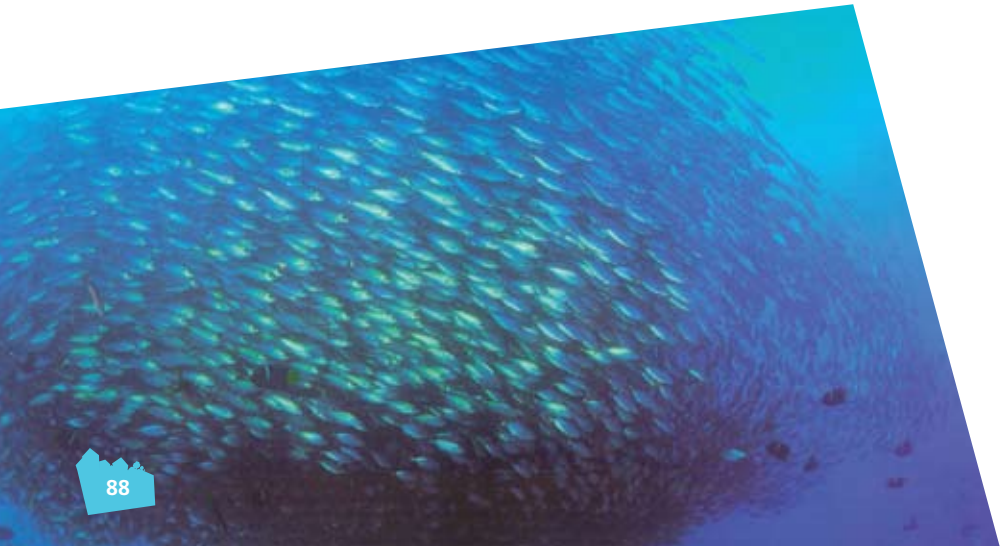
Another avenue is the production of biofuels from biomass. This is considered CO2 neutral in terms of emissions, as they have no net impact in the amount of CO2 emitted to the environment. The management of organic waste is a complex issue, but IPN is developing high-performance technology which can create biofuels from organic waste.

Founded in 1936, the Instituto Politécnico Nacional (National Institute, IPN) is the foremost public technological higher education centre in Mexico.

The institute produces technology development and research of the highest quality geared to solving the challenges facing humanity, of which climate change is the priority.

Its projects feed in to the National Strategic of Climatic Action of the Mexican government.

Instituto Politécnico Nacional
www.ipn.mx



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Carbon Clear is a world-leading carbon management company that works with organisations to measure their carbon footprint, cut emissions, and source high quality carbon offsets.

We help our clients to develop carbon management strategies that save them money, strengthen their brand, help them comply with climate change legislation and win the support of their customers and staff.

All of the offset projects that Carbon Clear invests in are carefully selected to ensure they support activities that genuinely improve the environment and the lives of real people. All projects must meet the following criteria:

- Projects must make a real difference to climate change mitigation and would not have been possible without carbon funding.
- Projects must provide long-term benefits to the communities that undertake them, such as job creation and the conservation of natural resources.
- Projects must undergo third party validation and verification – to show that the carbon reductions are real and permanent.

Carbon Clear is proud to have offset the emissions associated with production and distribution of this project.

www.carbon-clear.com

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