

OurPlanet

United Nations Environment Programme

December 2015



Global Climate Action Innovations and Best Practices



Angela Merkel
Switching to
Renewables

Enda Kenny
Growing
Solutions

Erna Solberg
Towards a
Greener Future

Jose Maria Neves
A Transformation
Strategy

Grant Shapps
Solar Revolution

Stefan Löfven
Beating Targets



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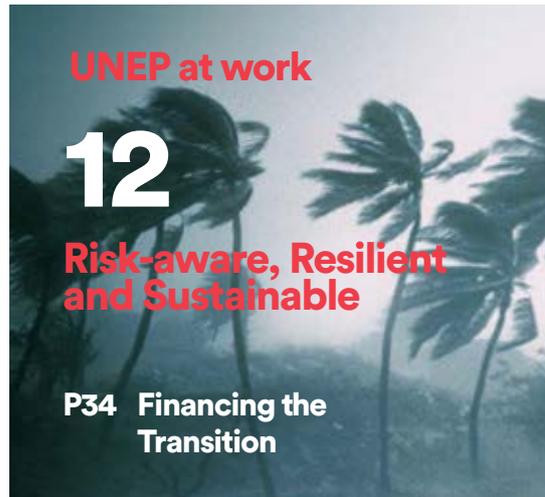
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Reflections



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Achim Steiner

United Nations Under-Secretary-General and UNEP Executive Director

This is turning out to be the year in which the world not only decided that growth must be sustainable, equitable and low-carbon, but took crucial strides towards the inclusive, green economy that can deliver it. Religious leaders called on the faithful to act on climate change and care for the environment, while financial leaders called on the private sector to recognise the threats and the opportunities at hand. In June, the G7 leaders pledged to phase out fossil fuels by the end of the century. In September, 193 national leaders adopted the 17 goals of 2030 Agenda for Sustainable Development and now they will close this historic year by coming together at COP21 in Paris to reach agreement on a deal to combat global warming.

As the UNFCCC Executive Secretary, Christiana Figueres, put it, the momentum for change has become “unstoppable”. What is at stake in now, is whether the transition will be fast enough to avoid the more devastating effects of climate change hitting the most vulnerable communities. The commitments so far are impressive and unprecedented, offering emission reductions of 25 per cent compared to current policies and pledges. However, as the

latest UNEP Emissions Gap Report shows, they will only do about half the job. That means we must progressively improve, including tapping the private sector and going further and faster than current national plans envisage.



Photo: © Ashley Cooper/Robert Harding Library



The momentum towards a low-carbon economy is unstoppable. Now it is up to governments to deliver the deal that ensures that the change occurs in time.

Agency. Almost half of that was invested while oil prices were rapidly falling, a development that some said would seriously damage renewables. Investment was nearly as high—and growing more rapidly—in developing countries as in developed ones. The 100,000 megawatts of added renewable capacity was equivalent to the total installed nuclear power capacity in the United States. It could outstrip new thermal capacity seven times over by 2030.

There is already, for example, about ten times as much solar power installed worldwide as was forecast as recently as 2007; the cost of solar cells dropped by half between 2010 and 2014 alone. It is now at or below grid parity in many countries and close in many more. Waves of innovation in finance and policy will drive costs down even further and expand markets even more. Meanwhile, small-scale solar is bringing electricity to millions of the world's poorest people, enabling children to study after dusk and offering escape from both the high cost and health damage of burning kerosene: a new British government initiative outlined in this edition of *Our Planet* aims to speed this up.

Another important breakthrough is also being made, literally, at those same grassroots. Restoring degraded land not only boosts food production and relieves poverty, but is one of the best ways of capturing and storing carbon from the air. As Monique Barbut, the Executive Secretary of the UN Convention to Combat Desertification, describes later in *Our Planet*, an African-led initiative to restore land from Senegal to Djibouti, creating a Great Green Wall, is expected to sequester up to three million tons of carbon a year.

Perhaps most encouragingly of all, the push for low-carbon, sustainable growth is gathering momentum in the financial sector. For 20 years UNEP has been working with over 200

financial institutions to help all stakeholders better understand the transition to an inclusive, green economy. As was clearly stated by Mark Carney, Chairman of the G20 Financial Stability Board and Governor of the Bank of England, failure to make that transition to longer term thinking could manifest itself in a 'tragedy of horizon.' Efforts from all sides are starting to bear fruit with the launch of the UNEP Inquiry to help individual states put sustainable development at the heart of their decisions and facilitate market reform; with nearly 400 signatories to the Investor Statement on Climate Change, representing assets worth over \$24 trillion, calling for a controlled move away from fossil fuels subsidies towards the development and deployment of renewable technologies; and almost 1,400 signatories, managing \$54 trillion of assets, committing to the UN-supported Principles for Responsible Investment.

And the hard talk is backed with hard cash: Abyd Karmali, Managing Director for Climate Capital at the Bank of America Merrill Lynch, recently described how, in committing to invest \$125 billion in low-carbon initiatives by 2025, his bank had bought "a non-exchangeable, non-refundable one-way ticket to a low-carbon economy". As Naoko Ishii, CEO and Chairperson of the Global Environment Facility reports in this magazine, the green bonds market had over \$36 billion in new issuances last year.

Clearly all sides now have a better understanding of the links between environmental, social and financial performance. Now we have to build on those foundations, accelerate progress and widen the impact. Together, we have passed the point of no return. The momentum—much of it driven by the private sector—is indeed unstoppable. Now it is up to governments to deliver the deal that ensures that the change occurs in time. ▲

For example, for several years the investment in new electricity generation from renewable sources has exceeded that in power from fossil fuels, reaching 60 per cent of the 2014 total according to the International Energy



Angela Merkel

An Investment in Our Future

*Germany is transforming its
energy system, for the sake of the
environment and the economy*



Angela Merkel
*Federal Chancellor,
Germany*

Germany is transforming its energy system. This is a challenging task for us, but I am certain that it is the way forward for climate protection. It also creates benefits for the economy. The transformation of Germany's energy system is, and will remain, a key undertaking for the federal government.

I regard it as an important investment in our country's future.

We need to safeguard affordability, competitiveness and security of supply, while meeting our climate goals of reducing greenhouse gas emissions by 40 per cent by 2020 and by 80 to 95 per cent by 2050 compared with 1990 levels. The transformation of Germany's energy system is thus in line with the G7 countries' decision this summer to decarbonize the global economy over the course of the twenty-first century.

We are aware that it is very important to the people of Germany and for our country as a location for business and investment that the energy supply be secure at all times. In order for the transformation of Germany's energy system to be a success, it is also vital that companies have planning and investment certainty.

The transformation of Germany's energy system creates great opportunities and prospects in many fields. The necessary investments create impetus for growth and employment in Germany and Europe, with German companies' great capacity for innovation playing a major role in this. Their ideas are crucial in making the transformation of our energy system a success. Germany has become a pioneer and technology leader in renewables and energy efficiency.

We have made good progress as regards developing renewables, an area where we have set ourselves ambitious goals. In 2014, over a quarter of the total electricity consumed in Germany was generated by renewables, thus continuing the trend of previous years. In 2015, the share of renewables in the energy mix is also likely to increase significantly once again, largely due to the considerable expansion of wind energy, both onshore and offshore.

In amending our Renewable Energy Sources Act last year, we took an important and necessary step to rein in the costs associated with renewables development. This is already proving successful. By refining the regulations on the compensation of industrial enterprises, we have also succeeded in safeguarding industrial value chains and jobs in Germany. The aim of the planned switch to calls for tenders from 2017 is to make renewables funding even more cost-effective. Renewables will be integrated into the market to a greater extent than before. As their share in the energy mix is increasing, they must take on greater responsibility for the electricity system.

Renewables development makes grid expansion essential. The growing amount of trade in electricity within Europe also poses new challenges to power grid operators. The power grids must be expanded and modernized on all voltage levels.

In order to expand the grids, more underground cables will be used in the future, initially in pilot projects. The aim here is also to ensure broad public support for the new power lines. Although underground cables are now standard in distribution grids, throughout the world electricity is usually transmitted via



In 2014, over a quarter of the total electricity consumed in Germany was generated by renewables, thus continuing the trend of previous years

overhead power lines. In other words, Germany is also leading the way here and developing new technologies for use in this field.

The energy supply will also remain reliable, secure and cost-effective as the share of renewables constantly increases. In order to ensure this remains so in the future, we will further develop our electricity market. Our aim here is not to completely restructure the market in terms of a capacity market, but rather to maintain, develop and simultaneously strengthen proven market mechanisms. Two aspects are of particular importance to us here: free-market electricity pricing and holding electricity suppliers to providing a reliable supply. Further measures will create greater flexibility in

In amending our Renewable Energy Sources Act last year, we took an important and necessary step to rein in the costs associated with renewables development. This is already proving successful.

the electricity market and make it possible to integrate renewables at a lower cost. A capacity reserve also safeguards the electricity supply. Unlike a capacity market, this reserve only includes power plants that are not active on the electricity market and thus do not distort competition and pricing. These power plants are only used when there is an imbalance between supply and demand despite free-market pricing.

The reduction of energy consumption through greater energy efficiency is a further pillar of the transformation of Germany's energy system. Greater energy efficiency does not only reduce energy costs, but also helps to create greater security of supply. In December 2014, we adopted a comprehensive strategy in the form of the National Energy Efficiency Action Plan, which includes measures to promote energy-efficient networks and the use of energy management systems, as well as grants for investments to increase energy efficiency in commercial and industrial production processes. In mid-2015, we also agreed to explore additional measures for greater energy efficiency in industry from 2016. The focus is on optimizing production processes so that less waste heat is generated or so it is used in an energy-efficient way.

Finally, research and innovation are also key action areas for the federal government in the transformation of our country's energy system. The energy system of the future will be fundamentally different to today's system. The energy system can only be transformed successfully by a large number of technological innovations—and research and development create the prerequisites for this.

We have already made great progress here, for example as regards reducing the costs of wind and solar energy. It is now important that we tap into other great potential in fields such as storage technology, electromobility and the next generation of solar technology. Energy research thus remains a strategic component of Germany's energy policy.

In order to switch to an affordable, secure and environmentally sound energy system, all those involved will have to make great efforts. In the long run, the transformation of Germany's energy system offers great opportunities for success. We have made significant progress on our path, and I am therefore confident that we will successfully transform our energy system.

I regard an energy system based on renewables as a model that can also be of benefit to other countries. The cost of renewables has decreased significantly in recent years, and in many parts of the world, electricity generated by solar and wind energy is now an economically attractive alternative, as shown by investments in countries such as Brazil, South Africa and India. Renewables also provide opportunities for a decentralized electricity supply, such as in rural regions in Africa.

This facilitates rapid and comparatively inexpensive access to energy, particularly in developing countries. In undertaking the transformation of its own energy system, Germany is playing a part in this. We have gained a great deal of experience, which we are happy to share with our partners all over the world. I hope that as many countries as possible will adopt this course and join us in pursuing it. Switching energy systems to renewables plays a vital role in meeting our climate goal of limiting global warming to under 2°C compared with pre-industrial levels. ▲

Erna Solberg

Towards a Greener Future

Norway pursues an ambitious policy to become a low-emission society by 2050



Erna Solberg

Prime Minister of Norway

The whole world is hoping for an ambitious agreement at the climate conference in Paris. Most countries are stepping up to the challenge and have submitted their proposed climate goals. This is positive, but it is still only a starting point. More concrete action will be needed if we are to limit the global temperature rise to 2°C. The Paris agreement should therefore include a collective time-bound goal on emission reductions, clear provisions for increasing national commitments over time and common rules for reporting progress and sharing information. A strong effort at global level will build trust among nations and thus help to increase ambition at the national level.

Norway wants to be at the forefront of this global transformation. We have committed ourselves to an ambitious target of a 40 per cent emission reduction by 2030 compared to 1990. This target is fully in line with the emissions pathways towards 2050 that according to the Intergovernmental Panel on Climate Change (IPCC) correspond to keeping global warming below 2°C.

In Norway, we have had a carbon tax for more than 20 years, and we have taken part in emissions trading since 2005. Today, 80 per cent of our emissions are covered by carbon pricing. We also have stringent environmental regulations, as well as requirements regarding technology. We support research and development in the field of green technology, especially related to our industrial sectors. Our climate policy is wide-reaching, and covers a broad spectrum of emission sources, sectors and gases, both at home and abroad. Without the measures we have adopted, estimates show that our emissions would have been 25 per cent higher in 2010 than was the case, and would be 35 per cent higher in 2030.

We have increased funding for research and innovation. One example is the Environmental Technology Scheme, which supports the construction of pilot and demonstration plants for more environmentally friendly technology. The public enterprise Enova is another example. Enova is working to spur the transition to greener energy generation and consumption, and to promote the development of climate and energy technology in Norway.

We have a strong industrial heritage in the maritime, energy, metals and materials industries. The expertise that we have built up in these areas is of great value for the development of hydropower, solar and wind energy, carbon capture and storage, and green vessel technology. We are also exploring how our sea areas and forests can offer businesses opportunities in the new bioeconomy. Our fish stocks are in a healthy condition as a result of sound management over many years. An ecology in balance can provide a solid basis for jobs, production and exports far into the future.

The Norwegian energy sector is unique in several ways. Due to an abundance of hydropower resources, almost all our energy is renewable. This, in turn, has enabled us to become a major exporter of energy-intensive products that are produced in an environmentally friendly way. Equally important is the opportunity to store large amounts of energy in reservoirs. Hydropower based on reservoirs is the only renewable form of energy production that can adapt to fluctuations in demand at short notice. The development of large-scale wind and solar production in Northern Europe has increased the demand for flexible hydropower production to supplement these more variable sources. The Norwegian government has recently granted licences for two new power cables to Germany and the United Kingdom respectively. Each will have a capacity of 1,400 MW, and are due to be completed in five to six years.

In response to the EU's Renewable Energy Directive, Norway and Sweden have developed a common market for green certificates. The two countries' common goal is to



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*We have committed ourselves to an ambitious target of a **40 per cent** emission reduction by 2030 compared to 1990.*

increase their renewable electricity production by a total of 26.4 TWh by 2020. This corresponds to the power consumption of more than half of all Norwegian households. The increase in renewable energy is expected to come mostly from wind power, hydropower and bioenergy. A study of the Nordic energy system by the International Energy Agency (IEA) shows that renewable power production in the Nordics could increase substantially if policies to reach the 2° C target are widely introduced. Indeed, the net export of electricity to continental Europe could amount to around 80 TWh by 2050.

We have also introduced incentives to encourage people to choose environmentally friendly solutions. One result is that one in five of the new cars sold in Norway is electric. Another example is grants given to households that replace oil boilers with renewable heating systems. This is helping people to prepare for a planned ban on the use of oil for heating buildings from 2020.

Due to an abundance of hydropower resources, almost all our energy is renewable. This, in turn, has enabled us to become a major exporter of energy-intensive products that are produced in an environmentally friendly way.

We have identified five priority areas where Norway can play a part in developing low-carbon solutions for use in Norway and in other countries. These are: strengthening Norway's role as a supplier of renewable energy; development of low-emission industrial technology; carbon capture and storage; reduction of emissions from the transport sector; and environmentally sound shipping.

Take environmentally sound shipping and low-emission technology as an example. This year Norway launched the world's first 100 per cent battery-powered car ferry. Running on clean Norwegian electricity, the ferry transports cars, goods and people across our longest and deepest fjord, Sognefjorden. Meanwhile, the Norwegian company Hydro is developing aluminium production technology with the world's lowest CO2 footprint. This could have spin-off effects way beyond our borders.

Our long-term goal is to be a low-emission society by 2050, and we are pursuing an ambitious policy to promote a green transition. Last year, we appointed a green tax commission to examine whether, and how, an increase in climate and environmental taxes combined with a reduction in other direct and indirect taxes, would reduce greenhouse gas emissions, improve environmental conditions and promote economic growth. If our policies and measures are to be effective, we need to engage all relevant stakeholders. Long-term predictability is also important, and we want to identify a clear strategic direction for our green shift. In June this year, we established a commission to draft an overall strategy for green competitiveness to be submitted by October 2016.

Every country must find its own way forward. These are some of the steps Norway is taking to prepare for a greener future. ▲

Jose Maria Neves

A Transformation Strategy

Cabo Verde is on track to supply all its rapidly growing electricity demand from renewable sources by 2030



Jose Maria Neves
*Prime Minister and
Head of Government of
Cabo Verde*

Climate change represents one of today's greatest challenges. The future of humanity is at risk, and for small island states such as Cabo Verde the situation is even more pressing. The moment to act is now in order to make up for lost time and take necessary measures before it is too late. The upcoming Paris Summit constitutes a source of hope for the world, especially for African countries and small island states, considering their particular exposure to climate change, in contrast with their high level of vulnerability and low resiliency capacity. This singular moment in history must not be wasted, and failure is not an option.

Africa must make this issue a high priority on its agenda. Cabo Verde has chosen the path of renewable energies, which, in addition to reducing energy dependency, is a way of promoting a low-carbon economy resilient to climate change.

Our option is to produce 100 per cent of our energy supply from renewable sources such as wind and the sun by 2030. For us, this is a transformational option that will serve as leverage for us to achieve our long-term objectives, consigned in the "Cabo Verde 2030" agenda, which calls for development with prosperity for all while ensuring environmental sustainability.

Our vision is to be a developed country by 2030, and our Transformation Strategy aims, among other objectives, to:

Expand the economic base through the development of tourism, the blue economy and a series of activities related to the sea, financial services, creative industries, information technology and renewable energies.

Build factors of competitiveness harnessing the potential of the "location" factor, given our position at the crossroads of three

continents, and transforming comparative advantages into sources of competitive advantages. Within this context, Cabo Verde opted, in addition to a strong investment to improve the quality of people's lives and address poverty, for an important institutional and physical infrastructure programme, namely to ensure access to energy for all.

As a result, this small country with no exploitable natural resources went, in a short period of time, from being one of the poorest countries in the world to a middle-income country—from a per capita gross domestic product around \$200 at Independence in 1975, to one of \$3,800 in 2014. Cabo Verde also eliminated illiteracy, has all of its children enrolled in the education system with gender parity and reduced the infant mortality rate from 108 to 21 per 1,000. In summary, it is one of the few African countries to have managed to achieve the Millennium Development Goals in 2015 and have made its national vision to achieve the Sustainable Development Goals by 2030.

Over the past ten years, per capita energy consumption and production has doubled, while the energy coverage rate has reached 97 per cent of the population, thus contributing toward reducing poverty by 10 percentage points over the past seven years. Renewable energies are a part of this effort, and at present approximately 30 per cent of the electricity produced in the country comes from renewable sources.

Between 2002 and 2012, due to the 7.8 per cent annual increase in energy demand, combined with the 10.3 per cent annual increase in fossil fuel prices, the cost of fuel imports rose twelve-fold. If this trend continues, expenses with imports will put major pressure on the country's macroeconomic equilibrium and competitiveness.

Studies carried out based on the enormous renewable energy potential in Cabo Verde (60 times the total energy demand in



Photo: © Shutterstock

The upcoming Paris Summit constitutes a source of hope for the world, especially for African countries and small island states.

Verde eliminated illiteracy, has all of its children enrolled in the education system with gender parity and reduced the infant mortality rate from 108 to 21 per 1,000.

2020) have identified the renewable energy capacities that need to be installed, including short- and long-term energy storage.

The 100 per cent clean energy scenario offers Cabo Verde many benefits. Indeed, due to the nature of renewable energy technology, it will be necessary, in order to respond to demand at any given moment, to produce surplus energy varying between 241 GWh and 553 GWh.

This energy surplus offers a unique opportunity to widen Cabo Verde's economic base in clean energies. Scarceness of water is one of the main problems faced by the islands, which are located in the semi-arid Sahel zone of Africa. The excess energy produced could be transformed, for example, into some 140 million cubic meters of desalinated sea water to be used in the development of agriculture.

Studies show that in such a scenario, electricity production costs could fall to between EUR 0.10 and 0.13 per kWh—in other words, less than half of current costs. As such, when costs are analyzed from a long-term perspective, the use of wind and solar energy, in addition to being more environmentally friendly and being feasible from the technical and environment point of view, is actually cheaper than using fossil fuels.

The strategic option for 100 per cent renewable energies implies radical changes in the organization and in the institutional and

legal framework of the energy sector, as well as a major effort in the management of the country's transformation, including wide-reaching reform in the organization of public electricity services. Investment will also be necessary in research and development and in training. Cabo Verde hosts the ECOWAS Regional Center for Renewable Energies and Energy Efficiency, and we recently created a Renewable Energies Training Center with the capacity to host students from the sub-region. We believe that Cabo Verde is in a position to create a renewable energies-based economic sector with an African, and particularly West African, vocation. International investors are welcome.

Another important challenge for a small island country has to do with the mobilization of resources for the financing of the enormous investments required, be they in the installation of renewable energy plants, be they in the creation of energy storage capacity. Here, it is important to come up with a financing structure with the flexibility necessary to implement the energy transition in several stages, associating donations and long-term, low-interest concessional loans and carbon credit, while at the same time attracting enough equity to avoid high capital costs.

It is our conviction that Cabo Verde will be able to achieve its goal of 100 per cent renewable energies by 2030, reconciling the ambition of energy security with the transformation of our economy and, at the same time, contributing to global environmental sustainability.

Cabo Verde is willing to serve as a laboratory for the world and demonstrate that it is possible to make the economy grow and improve people's quality of life with a strategic option for environment-friendly renewable energies. We want the world (government, non-governmental organizations, foundations, universities, research centres, investors and others) to join us in building this audacious platform for the future. The time to act is now. ▲

UNEP at Work

Risk-aware, Resilient and Sustainable

UNEP works with industry to build principles for sustainable insurance

Photo: © Mike Hill/Robert Harding Pictures

The insurance industry is uniquely positioned to promote sustainable development. As risk managers, insurers help communities understand, prevent and reduce risk through research and analytics, catastrophe risk models and loss prevention. Insurers also advocate proper land-use planning, zoning and building codes and promote disaster preparedness. As risk carriers, insurers protect households and businesses by absorbing financial shocks due to cyclones, floods, droughts and earthquakes. Insurance pricing also provides risk signals and rewards risk reduction efforts.

Insurers are major investors with \$29 trillion in global assets under management. Insurance for and investments in renewable energy, green buildings, low-carbon transportation, sustainable agriculture and climate-resilient infrastructure promote sustainable development.

The Principles for Sustainable Insurance Environmental, social and governance (ESG) issues pose a shared risk to insurers, business, government and society, providing a strong

incentive for innovation and collaboration. ESG issues—or sustainable development issues—include climate change, natural disasters, water scarcity, social and financial exclusion, human rights violations, ageing populations and corruption.

From 2006-12, the UNEP Finance Initiative's work with insurers led to the development of Principles for Sustainable Insurance (PSI).

Endorsed by the UN Secretary-General and insurance CEOs, the Principles were launched at the 2012 UN Conference on Sustainable Development in Rio de Janeiro. They serve as a global framework to address ESG risks and opportunities:

Principle 1: We will embed in our decision-making environmental, social and governance issues relevant to our insurance business.

Principle 2: We will work together with our clients and business partners to raise awareness of environmental, social and governance issues, manage risk and develop solutions.

Principle 3: We will work together with governments, regulators and other key stakeholders to promote widespread action across society on environmental, social and governance issues.

Principle 4: We will demonstrate accountability and transparency in regularly disclosing publicly our progress in implementing the Principles.

The Principles quickly became part of the criteria of the Dow Jones Sustainability Indices, FTSE4Good and Brazil's BM&FBOVESPA Corporate Sustainability Index.

Moreover, the Principles have led to the largest collaborative initiative between the UN and the insurance industry—the PSI Initiative. Today, nearly 90 organizations worldwide have adopted the Principles, including insurers representing 20 per cent of world premium and \$14 trillion in assets.

Turning the Principles into practice

Many insurers are showing leadership and innovation in implementing the Principles. For example, Allianz and Swiss Re's sustainability risk frameworks seek to better manage ESG



Environmental, social and governance issues pose a shared risk to insurers, business, government and society, providing a strong incentive for innovation and collaboration.

By 2030, 60 per cent of the world's population will be living in cities, which will be at the core of the climate conundrum. This is why AXA and the PSI have produced the first global study of how cities and small and medium-sized enterprises (SMEs) are building climate resilience, based on a survey of more than 40 city leaders and 1,100 SMEs. Meanwhile, Munich Re and the IFC are leading a global project to develop sustainability principles for underwriting surety bonds and infrastructure projects.

Based on the PSI, the Brazilian Insurance Confederation (CNseg) and Brazilian insurers have produced sustainability goals for their entire insurance market. On investment, Aviva engaged various stakeholders in developing a roadmap for sustainable capital markets. It has also put forward calls to action to mobilize the \$300 trillion of capital in financial markets to help realize the UN Sustainable Development Goals.

Promoting sustainable insurance policy and regulation

Insurance regulators, such as those of the Philippines, California and Washington State, are also showing leadership and commitment by signing the PSI. A 2015 report by the Bank of England's Prudential Regulation Authority highlights the importance of leadership and insurers' role in driving a wider societal response to climate change by, for example, "becoming a signatory to the Principles for Sustainable Insurance."

From 2014-15, the PSI and the UNEP Inquiry into the Design of a Sustainable Financial System conducted the first global consultation on how insurance policy and regulation could better support sustainable development. This led to a global report on how to harness insurance for sustainable development through to 2030. The report was launched at the 2015 IIS Global Insurance Forum, which was highlighted by the UN Secretary-General's opening address.

As the insurance lead, the PSI has contributed to ground-breaking policy initiatives

to green China's financial system led by the People's Bank of China, Development Research Center of the State Council, UNEP Inquiry and the International Institute for Sustainable Development (IISD).

The PSI and UNEP Inquiry are now exploring the creation of a Sustainable Insurance Policy Forum to scale up policy progress through enhanced collaboration.

Contributing to UN global policy frameworks

Last March, the PSI launched the "United for Disaster Resilience Statement", a global commitment by insurers to work with governments and other stakeholders in implementing the Sendai Framework for Disaster Risk Reduction.

At the Climate Finance Day last May, the PSI launched an online global platform for insurers to exercise leadership through voluntary commitments that support the aims of the third UN World Conference on Disaster Risk Reduction, third International Conference on Financing for Development, 2015 UN Sustainable Development Summit and 2015 UN Climate Change Conference (COP21).

Furthermore, the PSI has been supporting the development of the UN Secretary-General's global climate resilience initiative, which will be launched at COP21.

Finally, the PSI is now exploring the development of Insurance Development Goals to help realize the 2030 UN Sustainable Development Goals.

In just three years, the PSI has shown how the UN and insurers can work together in building a risk-aware, resilient and sustainable society. In the words of UN Secretary-General Ban Ki-moon, "The Principles for Sustainable Insurance provide a global roadmap to develop and expand the innovative risk management and insurance solutions that we need to promote renewable energy, clean water, food security, sustainable cities and disaster-resilient communities."

See more at: www.unepfi.org/psi

risks in business transactions. Munich Re has developed an underwriting tool to assess ESG risks in engineering projects. AXA has joined the African Risk Capacity, an insurance pool to protect African countries from extreme weather events. AXA has also committed to divest from companies most exposed to coal-related activities, totaling EUR 500 million, and to triple their green investment to over EUR 3 billion by 2020. Similarly, Aviva has committed to invest over \$3.8 billion in low-carbon infrastructure over the next five years.

Collaboration is at the heart of the PSI Initiative. In the past decade, average economic losses from natural disasters were \$190 billion per year, while average insured losses were \$60 billion per year. This century, more than one million people have already lost their lives to disasters.

In this context, IAG is leading the PSI Global Resilience Project, a multi-year collaborative initiative to help communities and governments develop effective approaches to reduce disaster risk and to drive greater investment in disaster risk reduction.

Stefan Löfven

Beating Targets

*Halving carbon dioxide emissions,
while doubling the size of the economy*



Stefan Löfven
*Prime Minister of
Sweden*

Sweden's ambition is to be one of the world's first fossil-free welfare nations. We will do our part to keep the world's temperature increase as far below 2°C as possible. We have much to gain by being at the forefront of the fight against climate change. An active climate policy is also a policy for the jobs of tomorrow. As Sweden leads the way and invests in climate-friendly technology, this strengthens our companies' competitiveness, and creates jobs and export revenues.

Sweden's effort to increase the share of renewable energy is an example of how climate change mitigation can go hand in hand with economic development.

In 2008, the European Union set a target of having 20 per cent of overall energy consumption from renewable energy by 2020. For Sweden, this was turned into a commitment to make half of our energy mix renewable. Sweden was able to meet that goal as early as 2012, the result of a long-term and strategic energy policy. This means that since the 1970s, Sweden has been able to halve domestic carbon dioxide emissions, while doubling the size of its economy.

Two things must happen at the same time to increase the share of renewable energy. Economic policy levers must be used to increase its use and reduce the share of fossil fuel. Investments must also be made in facilities and infrastructure to increase the volume of renewable energy and thereby reduce costs. It should be inexpensive, beneficial and attractive to use renewable instead of fossil energy.

There is now strong international support for the polluter pays principle as an economic policy lever. For Sweden, early application of this principle was key to being able to combine high climate ambitions with economic development. The carbon dioxide tax introduced in 1991, which put a price on carbon dioxide emissions, has been a particularly important instrument. Fuel tax, alongside other economic policy levers, is a powerful tool to reduce use of finite energy sources and create incentives to increase use of renewable energy sources. It has had an impact in heating and industry, and in beginning the transition from fossil fuels to biofuels in transport.

Sweden has unique conditions for energy production. We have natural resources, forests and watercourses, which have been crucial for our transition from dependence on fossil fuels to renewable energy. Not all countries have such favourable conditions, which is why technical development in solar and wind power is so important. These energy sources can be used nearly all over the world, and in recent years we have seen the global use of renewable



Photo: © Kunst & Schickel/Robert Harding Library

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*Sweden is, and intends to remain, one of the **largest donors of climate support**, and is the largest per capita donor to the UN Green Climate Fund.*

solar and wind power energy increase many times over. We are in the midst of a global solar power revolution.

However, the fact that we achieved the EU 2020 goal on renewable energy ahead of schedule does not mean there is time to sit back and relax. For the coming years, the Swedish government has presented an aggressive budget in terms of environmental and climate efforts. We have introduced local climate investment support for municipalities and regions. To help meet our goal of 100 per cent renewable energy, the ambition for the electricity certificate system will be raised and investment support will be introduced for solar energy. We are supporting technological development for energy storage, establishing a national forum for smart electricity grids and investing in energy efficiency measures in housing. To reduce the carbon footprint of transport, the government is preparing a bonus-malus system for cars, investing in railway maintenance and providing support for electric cars and buses. We will also raise energy tax on petrol and diesel.

However, central government cannot succeed in the climate work on its own. It is important that companies see the economic value of transition to a low-carbon society. We provide the market with stability and predictability through clear, long-term political

vision on the importance of giving up fossil fuel dependency; this is a prerequisite for companies daring to invest in new, clear, effective technology. Public funding of research and innovation in the energy area is essential.

Research and innovation must also benefit the whole world. While we are facing a transition to renewable energy, 1.3 billion people are still without access to electricity. This is a gigantic obstacle to development. Yet, at the same time, it is an opportunity to take the step directly to solar and other renewable energy sources instead of taking detours via fossil fuels. Sweden is, and intends to remain, one of the largest donors of climate support, and is the largest per capita donor to the UN Green Climate Fund. Ahead of 2016, the government will therefore increase climate finance for investment in developing countries: in green technology, reduced emissions and adaptation to a changed climate.

No country can meet the challenge of climate change on its own – everyone must help contribute. At COP21 in Paris, Sweden wants to see a global, fair and legally binding climate agreement that will help keep global warming as far below 2°C as possible. The agreement must also make it possible for countries to take ever more ambitious emission reduction measures over time. This is the greatest challenge facing our generation and time is short. ▲

Enda Kenny

Growing Solutions

Best practice agriculture is reducing carbon emissions, while maximizing benefits from the land



Enda Kenny

Taoiseach of Ireland

This year marks the sixtieth anniversary of Ireland's membership in the United Nations, and is also the year in which Ireland had the great privilege of co-facilitating the negotiation of the Sustainable Development Goals. The significance of the SDGs is immense, applying to all countries and all people. Never before have the world's countries come together to agree on such a comprehensive agenda, representing humanity's common plan to eradicate poverty and build a more peaceful and fair world.

This year has also seen an unprecedented response in the lead-in to COP21. More will need to be done if we are to reach our goal of keeping the average global temperature increase to below 2°C above pre-industrial levels. It is heartening to see, however, that over 90 per cent of global emissions are covered by a plan and that more than 150 countries have engaged their parliaments and citizens on the issue.

Success over the next fortnight will set the world on a more sustainable pathway and greatly support progress under many of the SDGs. One clear example is the link between the global challenges of hunger, nutrition and climate change. How do we produce enough food, while tackling both the causes and impact of climate change?

The most recent report from the Intergovernmental Panel on Climate Change shows that production of certain staple foods is already impacted by climate change, even at an increase of less than 1°C. These impacts are projected to increase at least to the middle of this century. Globally, our challenge is to make food production systems sustainable and resilient.

Ireland, through the Irish Aid programme, is supporting adaptation in agriculture, food and energy systems, and strengthening the resilience of poor households, primarily in sub-Saharan Africa. In the southern Ethiopian region around Hawassa Lake, Irish Aid is helping up to 45,000 households adapt to the effects of climate change, build resilience to extremes and integrate climate-smart agricultural solutions into long-term development. In Zambia's Northern Province, we are supporting training in climate-smart crop, livestock and aquaculture production and the sustainable use of wetlands.

While these initiatives are helping vulnerable communities to anticipate, manage and respond to increasingly regular shocks and stresses, the scale of the challenge requires us all to review our support. Ireland will commence contributions to the Green Climate Fund in 2016 and explore options to increase climate finance, both public and private from Ireland.

At home, producing more food, while at the same time combating climate change, is one of the most important policy challenges Ireland faces. I am proud that Ireland is leading the way in terms of sustainable farming practices, forestry management, food production and research. We are reducing emissions by employing best practice in farming methods, energy generation and consumption, and afforestation.

Ireland's Origin Green and Beef Data and Genomics programmes seek to maximize the benefits from our land, while reducing emissions and encouraging sustainability. Ongoing



It is essential that we leave Paris with an ambitious and binding agreement on how, collectively, we will address climate change.

*Irish Aid is helping up to **45,000 households** in Ethiopia adapt to the effects of climate change, build resilience to extremes and integrate climate-smart agricultural solutions into long-term development.*

scientific research and investment in knowledge transfer, to improve adoption rates at farm level, will also be critical in achieving our environmental goals.

There are challenges, too—more work is needed to further enhance carbon uptake in biomass and soils, while maintaining and enhancing farm livelihoods. Afforestation is part of this, but not the full solution. We are increasingly looking at how to better manage and build carbon stocks in our grazing and crop lands.

This has been a key area of research investment and the solutions we find can be shared globally. Science and research are critical to a global response to these challenges. This is why Ireland hosted the IPCC expert workshop on climate change, food and agriculture in May 2015 and together with Tanzania, New Zealand and Costa Rica we've proposed a Special Report on the topic.

Our efforts in the agriculture sector are matched by initiatives across government to address emissions. In the coming weeks, the Irish Parliament will adopt a Climate Action and Low Carbon Development Bill, which will greatly enhance our policy framework for both mitigation and adaptation. This will enable us to play our part in the accelerating global effort.

This year has already seen the world come together once to ensure our collective future; it is now essential that we leave Paris with an ambitious and binding agreement on how, collectively, we will address climate change. The negotiations ahead will not be easy and we will all have difficult decisions to make, but protecting our climate protects our environment, the quality of life of our people and the long-term prosperity of our countries. Our combined efforts in Paris over the next two weeks will go a long way towards ensuring a sustainable future for all. ▲

Grant Shapps

Solar Revolution

The Energy Africa campaign wants to bring clean energy to hundreds of millions of people beyond grids



Grant Shapps

*Minister of State,
Department for
International
Development, United
Kingdom*

Take a look at a map of Africa and it is difficult not to be struck by the sheer complexity and scale of the continent. But a look at an image of Africa at night and you would be hard pressed to see anything at all: while much of the rest of the world is lit up, almost all of Africa remains dark.

Two out of three people in Africa—around 600 million people—simply do not have access to electricity. Without a reliable energy supply, their businesses, schools, clinics and daily lives simply have to shut down, when the day ends or power fails.

At the current rate, the continent will not achieve universal energy access until 2080—200 years after Edison invented the light bulb. Those who can get electricity pay as much as 66 times more as someone in the United Kingdom. Meanwhile, economic growth is stifled as power outages cost countries in Africa between 1-2 per cent of their annual gross domestic product.

This is unacceptable, but the latest solar technology provides a clean and affordable way to make an immediate difference. That is why I have kickstarted the UK's Energy Africa campaign to light up the continent quickly without resorting to technology that produces high emissions of carbon dioxide.

There are four solid reasons why now is the right time to invest in a solar revolution across Africa. The price of solar photovoltaic panels has plummeted in recent years; battery technology has radically improved; electrical appliances have become more energy efficient; and, most important of all, the spread of mobile payment systems is enabling people

to pay for electricity on a micro pay-as-you-go basis, for less than they already spend on kerosene.

There are already successful examples across Africa. British companies like Azuri, M-KOPA and BBOXX are combining solar and mobile phone technology to bring clean energy to people. Their pay-as-you-go solar systems provide emission-free lighting and enough power to charge mobile phones.

I have seen for myself the difference this can make. On my first visit to Africa after becoming a Minister at the UK's Department for International Development, I visited the home of a 62-year-old woman named Elizabeth Mukwimba who lives in Mwanza province, Tanzania. Until recently, she had to buy expensive and toxic kerosene in order to cook and light her home. To charge her mobile phone, she had to walk to the village and pay exorbitant rates, many times what we pay to charge our phones.

Thanks to a British aid project, she now has a solar panel attached to her home and a clean cook-stove. This has transformed Elizabeth's life, giving her clean and reliable electric light and energy.

It is about more than switching on a light. It means the day does not end when the sun goes down. It means women and girls spending less time gathering fuel to burn. It means being more able to start a small business at home. It means not having to walk kilometres to charge a mobile phone. It means saving money on expensive kerosene. It means helping your children learn after school.



Photo: © Sean Sprague / Robert Harding Library

As we come together in Paris this year to generate renewed support for tackling the root causes of climate change, there is an immediate and emission-free solution to Africa's lack of power.

Economic growth is stifled as power outages cost countries in Africa between 1-2 per cent of their annual gross domestic product.

Solar's potential does not stop in the home. During a recent visit to Nigeria, I met a team of solar technicians from Lagos who are at the vanguard of this movement. They help monitor a bank of batteries and solar panels installed at a health centre in Epe.

Before the cells were in place, the clinic had to survive on roughly two hours of energy every day. Mothers and medical staff relied on candles for night time births. The solar

panels, installed with support from Britain, now allow it to run throughout the day and night.

The benefits of these changes could not be clearer and the impact could be huge. And the key thing is that with the latest technologies and business models, it can largely be delivered by the market.

But I recognize that while the opportunity is great, the challenges can also be significant. Red tape, regulatory barriers and access to finance can act as a disincentive to wider investment in solar energy in developing countries. Over the coming months, we will use the momentum of our campaign to tackle these obstacles.

Earlier this year, I met with investors, including Richard Branson, whose company Virgin Unite is exploring investment in Africa, and Seth Merrin, of investment group Liquidnet, to better understand some of the concerns of potential investors.

This collaborative approach has helped shape what the Energy Africa campaign is set to achieve and reaffirms why now is the time to act. Against the backdrop of our commitment this year to the global Sustainable Development Goals, we have the knowledge and impetus to bring energy to millions of people in Africa.

Launched this month with Kofi Annan in London, our Energy Africa campaign brought together African governments, funders and financiers, businesses and solar experts to kickstart this work.

As we come together in Paris this year to generate renewed support for tackling the root causes of climate change, there is an immediate and emission-free solution to Africa's lack of power. Together we can create the basis for household solar market expansion and make a real difference to the lives of millions. ▲



Photo: © Mark Edwards / Robert Harding Library



A Renewed Commitment

A record year for renewable energy helps uncouple economic growth and emissions

On the eve of COP21 in Paris, the world seems poised to adopt more renewable energy than ever. According to REN21's *Renewables 2015 Global Status Report*, the use of renewable energy around the world set a new record in 2014. Moreover, for the first time in four decades, growth in the world economy was decoupled from CO₂ emissions. And renewable energy investments in developing countries, up 36 per cent from 2013, were nearly on par with those in the developed world.

REN21, the global renewable energy policy network, facilitates knowledge exchange, policy development and joint action towards a rapid global transition to renewable energy. Its *Renewables Global Status Report (GSR)*, first released in 2005, provides a comprehensive and timely overview of renewable energy market, industry, investment and policy developments worldwide.

The tenth anniversary report shows a dramatic uptake in the use of renewable energy over the past year: about 135 gigawatts (GW) of added renewable energy power in 2014 increased total installed capacity to 1,712 GW, an 8.5 per cent increase from the year before. It also underscores the decoupling of energy use and the economy: despite an average annual 1.5 per cent increase in energy consumption in recent years and an average 3 per cent increase in gross domestic product, CO₂ emissions in 2014 went unchanged from the year before.

Global new investment in renewable energy and fuels (excluding large-scale hydropower) increased 17 per cent from 2013. In fact, global new investment in renewable power capacity was twice the amount of investment in new fossil fuel power capacity.

Developing countries, led by the People's Republic of China, invested \$131.3 billion in renewables in 2014. Yet, across the developing world, more than one billion people still lack access to electricity. With installed capacity of about 147 GW, Africa has less power generation capacity than Germany.

In June, REN21 released its first regional report for the Southern African Development Community (SADC) on renewable energy and



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Photo: © Robert van Waarden/Robert Harding Library



efficiency, painting a comprehensive portrait of a region in transition.

With a population of 298 million, the 15 member states of SADC accounted for about 32 per cent of the total population in sub-Saharan Africa. Despite both regional and national efforts to diversify energy resources, most SADC members still rely on biomass. Use of traditional biomass, such as wood and charcoal, accounts for more than 45 per cent of final energy consumption in the region.

Apart from the environmental impact of extensive fuelwood cutting, biomass use for cooking and heating is the primary cause of household air pollution. Poor indoor air quality kills more than 153,000 people in the region each year. Four SADC countries—Lesotho, Malawi, South Africa and Tanzania—have been designated as “partner countries” for the Global Alliance for Clean Cookstoves.

But if biomass use is deadly inside the home, it can also be a renewable fuel in the proper setting. Within the region, the potential for biomass-generated electricity is estimated at 9,500 megawatts (MW) based on agricultural waste alone. Recent projects include the 4.4 MW Bronkhorstspuit biogas generation project in South Africa, which uses cow dung decomposition to fire a boiler and generator. The country also generates electricity from wood waste at pulp and paper plants, and joins others such as Malawi, Mauritius and Zambia to generate power from the methane of municipal waste.

Overall, large-scale hydropower for electricity generation is the main source of renewable energy in the region. Interest in solar and wind energy, however, is growing. Apart from large-scale wind farm operations like Jeffrey’s Bay in South Africa, Namibia is gradually developing innovative off-grid projects such as the Gobabeb Training and Research Station and a solar PV installation of 26kW. For its part, Botswana has installed a number of solar PV off-grid mini-grids over the past decade for a total capacity of 50 kW.

Unquestionably, South Africa drives the region’s renewable energy sector. In 2014, South Africa alone accounted for \$5.5 billion of the \$8 billion investment in renewable energy. Small and large investors alike, however, are increasingly looking beyond the country to Mozambique and Tanzania, which have progressive regulatory regimes in place. Investors are also targeting countries with existing or planned feed-in tariffs such as Angola, Botswana, Namibia and Zimbabwe. With prospective investment in new large-scale hydro in the Democratic Republic of Congo, Mozambique, Zambia and Zimbabwe, investments in renewables outside of South Africa are expected to surge in coming years.

For REN21, the African continent stands ready to be a leader in renewable energy development and deployment—not simply as a means to improve energy security and respond to climate change, but also as an investment in economic development, jobs, health and safety.



See more at: <http://www.ren21.net/>

Naoko Ishii

Making Greenbacks Go Green

Breakthroughs in green finance, backed by a steady international commitment, are helping to make possible a fresh start for the planet



Naoko Ishii

*CEO and Chairperson,
Global Environment
Facility*

It's increasingly evident that our planet is in peril. We are experiencing the warmest year on record with many countries and communities already feeling the negative impacts of a changing climate. Droughts, violent storms, increased coastal erosion and other changes are destabilizing critical ecosystems and undermining livelihoods, particularly among the poorest and most vulnerable populations.

To win the fight against climate change and safeguard the global environment, we need a large-scale transformation in our economies. This will require actions on multiple fronts and at all levels of society.

Three things will facilitate this. First, the COP21 climate change talks in Paris need to deliver a credible, strong agreement that puts the world on a path to a decarbonized global economy by the second half of the century. Second, we need strong actions on mitigation and adaptation both before and after 2020 by a broad coalition of stakeholders. And, third, we require the necessary finance to underpin the new agreement and actions on the ground.

The good news is that we are starting to see breakthroughs in all these areas. But we need to do more.

The Global Environment Facility's (GEF) commitment to address climate change issues is unequivocal. In 2013-14, we committed \$1.4 billion for adaptation and mitigation action. By the end of our current funding cycle in June 2018, we estimate the GEF will

be making about \$3 billion available to developing countries to help address climate change, and expect more than \$25 billion to be leveraged from other sources.

As a financial mechanism of the United Nations Framework Convention on Climate Change (UNFCCC), the GEF is supporting developing countries' shift towards a low-emission development path. Besides our ongoing support to countries in their UNFCCC obligations (such as national communications and biennial update reports), we have provided financial support to 46 countries to prepare their Intended Nationally Determined Contributions; we stand ready to help make these "investment plans" operational.

We're also actively supporting the 12 action tracks of the Lima Paris Action Agenda to showcase coalitions, partnerships and integrated approaches for action on the ground in areas such as energy efficiency, land degradation, deforestation, food security, sustainable cities and resilience.

One of the greatest opportunities for scaled-up climate finance lies in unleashing the most dominant driver of global economic activity: the private sector.

Consider recent progress in the areas of green bonds and renewable energy finance. Created to increase funding by accessing the \$80 trillion bond market and expanding the investor base for climate-friendly projects worldwide, the green bonds market had over \$36 billion in new issuances in 2014.

At the same time, there is growing evidence of increased investment in renewable energy. Earlier this year, an analysis from Bloomberg New Energy Finance argued that renewables look set to make up almost 60 per cent of added electricity capacity over the next



Photo: © Ashley Cooper/Robert Harding Library

Droughts, violent storms, increased coastal erosion and other changes are destabilizing critical ecosystems and undermining livelihoods, particularly among the poorest and most vulnerable populations.

*By the end of our current funding cycle in June 2018, we estimate the GEF will be making about **\$3 billion** available to developing countries to help address climate change*

25 years. The mobilization of private investments is critical for successful transformation of the world's energy systems.

At the GEF, our experience shows that targeted grant finance can be a critical step to enhance private sector engagement in market-based solutions. Generally, GEF climate finance mobilizes about one dollar from the private sector for each dollar from a GEF grant. But based on a suite of innovative financial instruments—including partial risk guarantees, equity investments and debt instruments—that we have been piloting recently, we have mobilized approximately seven dollars from the private sector for each dollar from the GEF.

It is vital we continue innovating on the ground to help developing countries and private sector partners match the right types of financial instruments to specific projects, goals and objectives. Interestingly, we are now seeing demand for such innovative instruments in other climate-relevant areas than the “traditional” energy efficiency and renewable energy fields. For example, at the last GEF Council in October, a new project was approved that will mobilize private financing for land restoration in Latin America through the provision of GEF-funded guarantees or subordinated loans.

Given that we're already locked into climate change trajectories for many years to come, adaptation will be at the core of the new climate agreement. And the international community needs to

ensure finance flows to the poorest and most impacted countries. At the GEF, we have a strong track record to build upon, and a valuable set of experience that can help provide guidance going forward. With nearly \$1.3 billion in funding approvals from our two dedicated adaptation funds—the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF)—in nearly 130 countries, our adaptation programme will directly reduce the vulnerability of more than 17 million people.

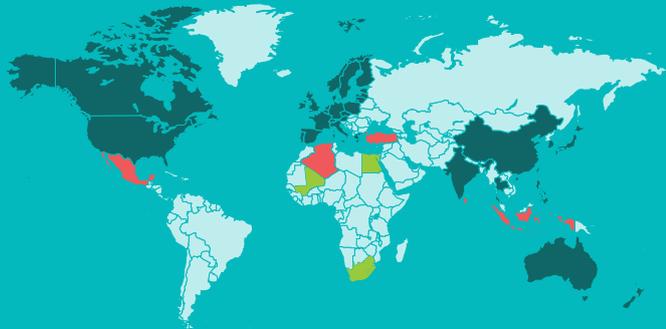
At the same time, it will help 70 countries integrate climate risks into their policymaking and planning processes. Demand for financing from our two funds remains strong.

Paris is a huge opportunity to demonstrate political ambition and action on climate change. The recently adopted Sustainable Development Goals recognize that the health of the global commons is essential for a thriving world. They provide a guide to where we will have to invest in order to transform our economies and prosper within planetary boundaries. And they hold the promise of a fresh start for our planet. But if we don't tackle climate change, it will be impossible to achieve these goals.

With the right partnerships, private sector engagement, and necessary innovative, scalable investments, we can ensure that our response to climate change is one that delivers on our promise of development and environmental protection for all for generations to come. ▲

Policy Maps

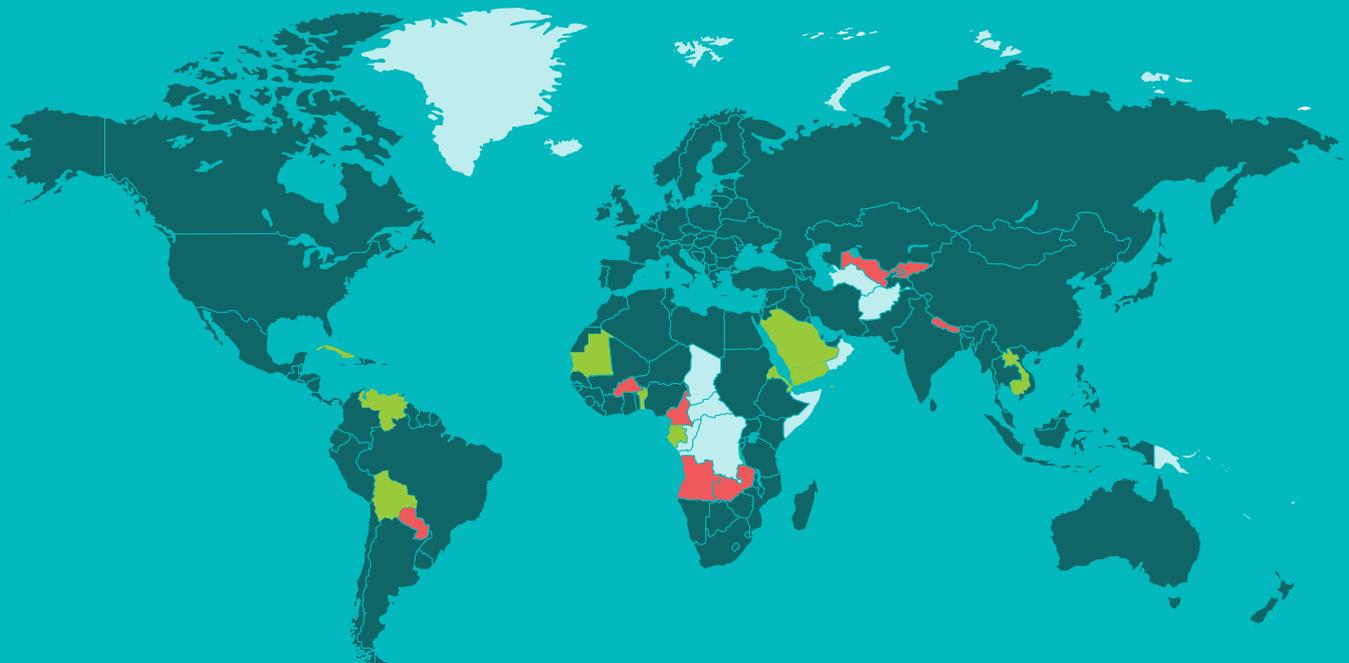
Countries with Renewable Energy Policies and Targets, 2005



2005

IN 2015
164
COUNTRIES
HAD DEFINED
RENEWABLE
ENERGY TARGETS

Countries with Renewable Energy Policies and Targets, 2015



- With policies and targets
- With policies and no targets (or no data)
- With targets and no policies (or no data)
- No policies/targets or no data

2015

Countries are considered to have policies when at least one national or state /provincial-level policy is in place.

Policy Trends

Data Source: REN21 Policy Database

Number of Countries with Renewable Energy Policies, by Type, 2011 - 2015

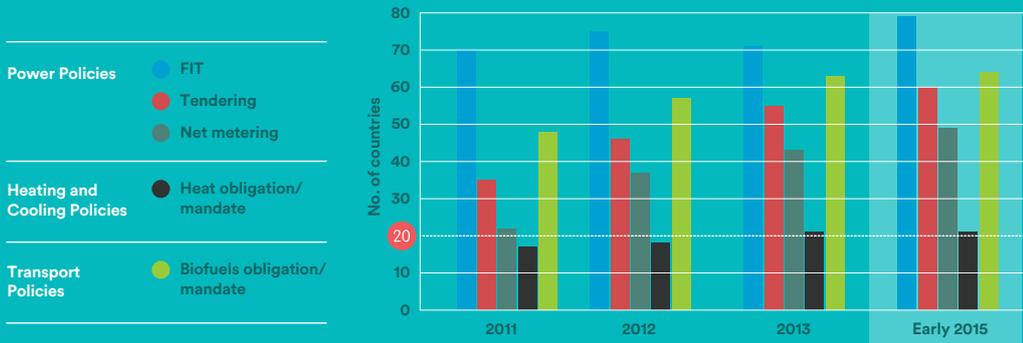
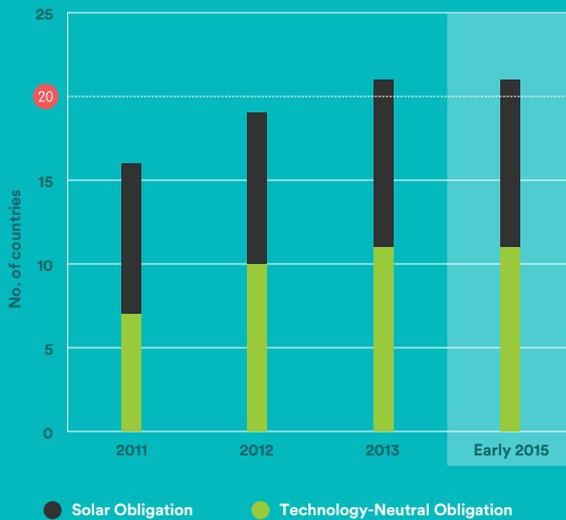
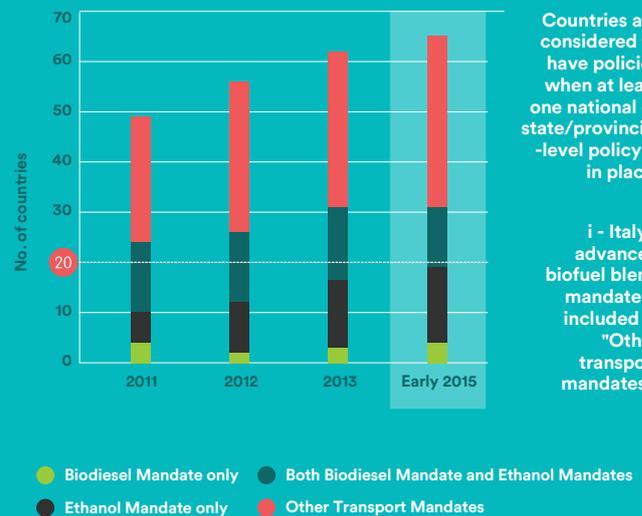


Figure does not show all policy types in use. Countries are considered to have policies when at least one national or state/provincial-level policy is in place. Countries with multiple policies of the same type (e.g., national and sub-national FIT policies) are represented as one unit in the total number of countries with that policy type.

Number of Countries with Renewable Energy Heating and Cooling Obligations, by Type, 2011 - 2015



Number of Countries with Renewable Energy Transport Obligations, by Type, 2011 - 2015



Countries are considered to have policies when at least one national or state/provincial-level policy is in place.

i - Italy's advanced biofuel blend mandate is included in "Other transport mandates".

Share of Countries with Renewable Energy Policies by Income Group, 2004 - 2015



Declines in income group shares in specific years are due primarily to countries moving into new income groups. Over the period 2004-2014, 80 countries made a total of 108 changes in income groups.

Fatih Birol

Going Electric

Electric vehicles can help shape sustainable mobility and will be crucial for a successful transition to a low-carbon economy



Dr. Fatih Birol

*Executive Director,
International Energy
Agency*

Transport is fundamental to modern life. Yet the global transport system, as it currently exists, is unsustainable, contributing almost one-quarter of global energy-related CO₂ emissions. At the same time, transport (along with power generation) has experienced the strongest growth among energy demand sectors since 1990. It is also the least diversified of them, with oil products representing more than 90 per cent of energy consumption.

This is a problem that is not going away. Indeed, in future energy scenarios that reflect business as usual, energy use and greenhouse gas (GHG) emissions from transport are set to rise by roughly 50 per cent by 2050. The current and future importance of transport GHG emissions suggests that we will need to include significant mitigation strategies in the transport sector if we want to limit the global average temperature rise to 2°C, the internationally agreed climate goal.

So where are the opportunities for reductions? Energy savings and GHG emission mitigations in transport can be achieved with policies and technologies that manage travel demand, improve the energy efficiency of vehicles and reduce the GHG intensity of fuels. These actions would also reduce other negative impacts of transportation, such as time losses due to congestion, high exposure to local air pollution in urban environments, safety issues and noise.

Electro-mobility can make a significant contribution. Electric vehicles (EVs)—which include battery electric, plug-in hybrids and fuel cells—have the capacity to deliver substantial improvements in energy efficiency for virtually all inland transport vehicles. They can increase

diversification of energy sources in transport and—in a framework of economy-wide efforts aimed at reducing GHG emissions — can help reduce the GHG intensity of transport. EVs do not lead to tailpipe emissions of local pollutants and are much quieter than vehicles using internal combustion engines. Road electro-mobility is also well placed to stimulate innovation and sustainable economic growth. Recent economic assessments not only identify a positive impact on gross domestic product for scenarios characterized by high electro-mobility deployment, but positive impacts on employment as well.

Today's EVs offer performances competitive with conventional internal combustion vehicles and enjoy high consumer satisfaction, but they still cost more than conventional vehicle technologies. Despite this, EV deployment has grown significantly in recent years. The number of electric passenger cars on the world's roads exceeded one million in September 2015, up from fewer than 30,000 in 2010. This was primarily thanks to battery electric and plug-in hybrid cars. The number of electric two wheelers exceeded 200 million in 2015, representing more than a fifth of the global stock, thanks to wide and fast deployment in Chinese cities.



Electric vehicles—which include battery electric, plug-in hybrids and fuel cells—have the capacity to deliver substantial improvements in energy efficiency for virtually all inland transport vehicles.



Photo: © Shutterstock



Photo: © Shutterstock

The number of electric passenger cars on the world's roads exceeded one million in September 2015, up from fewer than 30,000 in 2010.

Policy support from public authorities and investment from the private sector has been driving this change, and this combination continues to deliver cost reductions and technology improvements. Infrastructure, vehicles, transport and energy policy instruments allowing for integrating road electro-mobility into a low-carbon transport system are now available as never before. These developments, combined with the large potential of EVs to contribute to objectives of climate change mitigation and increased transport sustainability, call for continued action in the coming years.

According to the International Energy Agency (IEA), the deployment and use of EVs compatible with a 2°C stabilization pathway would require 20 per cent of all road transport vehicles to use electric motors by 2030; light vehicles (especially two wheelers and cars) would make a primary contribution. This would correspond to a vehicle stock of 400 million two-three wheelers and 150 million cars by 2030. EV deployment would then have to exceed 55 per cent of all vehicles by 2050, leading to an EV stock at that time of close to one billion two-wheelers and one billion cars.

Realizing these targets will require ambitious, systemic and long-term policy commitment. Markets with sustained consumer, vehicle, infrastructure and policy support will need to drive the global fleet and vehicle registrations towards these targets. Much will depend on how transnational, national and local administrations deploy policy measures and financial instruments to stimulate changes in behavior. These tactics could include fiscal incentives, advantages with respect to parking and road pricing, or waivers on access restrictions. Meeting the 2°C climate goal will also depend on how stakeholders in the private sector—who will need to deploy the technologies and mobilize most of the investments required to implement the transformation—will react to these signals.

The IEA has been involved directly in the field of electro-mobility since 2010, when it became host of the Secretariat of the Electric Vehicle Initiative (EVI), one of the action-driven, transformative clean energy programmes established under the Clean Energy Ministerial. Very recently, EVI and the IEA contributed to the development of the *Paris Declaration on Electro-Mobility and Climate Change & Call to Action* for the twenty-first Conference of the Parties to the United Nations Framework Convention on Climate Change.

The IEA is committed to building upon this work to meet the challenging objectives set by the 2°C climate goal. Through EVI, the IEA will continue to:

- encourage the development of national deployment goals
- collect and disseminate information on best practices and policies
- work with cities to share experiences and lessons learned from early EV deployment in urban areas and regions
- share information on public investment in RD&D programs to ensure that the most crucial global gaps in vehicle technology development are being addressed
- engage private-sector stakeholders to better align expectations, discuss the respective roles of industry and government, and focus on the benefits of continued investment in electric vehicle technology innovation and electric vehicle procurement for fleets. ▲

Monique Barbut

Land Matters

Restoring degraded land is the missing piece of the climate puzzle, with huge potential for mitigation



Monique Barbut

*Executive Secretary,
United Nations
Convention to Combat
Desertification*

Land is the foundation of our societies and the engine of economic growth for much of the world. Halting and reversing its degradation will help secure enough healthy and productive land to support soil fertility, water availability and biodiversity for a population of 9.5 billion by 2050. It is now recognized as a prerequisite for sustainable development within the global goals.

Achieving “land degradation neutrality” (target 15.3 of the Sustainable Development Goals or SDGs) will help frame and sharpen the focus of national ambitions. It is a welcome step forward, but not sufficient in climate terms.

Until now, land use has largely been overlooked, even though it represents almost 25 per cent of total greenhouse

gas emissions and, at the same time, has great potential for carbon sequestration. Degraded land cannot, of course, hold much carbon, nor can it help our communities and ecosystems cope with the growing impacts of climate change. However, as we close this historic year for global agreements, it is increasingly clear that rehabilitating—and improving—the management of our land resources on a large scale can, and must, be an important part of the climate solution.

Sustainable land management (SLM)—and such rehabilitation practices as conservation agriculture, agroforestry and ecosystem restoration—both reduce emissions and bring carbon back to where it belongs: in the soil and vegetation. These practices almost always come with adaptation co-benefits. Their efficient use of land resources not only ensures greater food, water and energy security, it also helps build resilience and store carbon for the long term.

So as we struggle to find the level of ambition needed to keep us on track to meet the 2°C target, we should not overlook the land. While many options are being considered, land is the missing piece of a difficult and complex climate puzzle. Sustainable and rehabilitating measures can deliver cost-effective results that will help close more than half of the remaining emissions gap left open by current commitments in the Intended Nationally Determined Contributions (INDCs).

Sustainable land management—and such rehabilitation practices as conservation agriculture, agroforestry and ecosystem restoration—both reduce emissions and bring carbon back to where it belongs: in the soil and vegetation



As we struggle to find the level of ambition needed to keep us on track to meet the 2°C target, we should not overlook the land.

*From 2000 to 2010, chemicals production increased by nearly **300 per cent** in China, which is now the largest chemicals-producing nation.*

One example at the required scale is the Great Green Wall, a major African-led initiative to “green” a 7,775 km stretch from Senegal to Djibouti. Since the launch of this initiative in 2008, significant progress has already been made in restoring the fertility and productivity of Africa’s Sahara-Sahel region. It can take as little as \$20 to rehabilitate 1 hectare of farmland in Africa using traditional agroforestry, water conservation and livestock management practices.

The Great Green Wall is designed to overcome a host of challenges. It will make populations more food- and water-secure even in times of drought induced by climate change. And it will ease tensions and conflict over limited natural resources, offering jobs and opportunity. In so doing, it will address one of the root causes of social instability and migration, and the population will simultaneously become less vulnerable to conflict and the threat of radicalisation.

The benefits of this pioneering initiative extend beyond the region and, indeed, the African continent. It is estimated that up to 3 million tonnes of carbon will be sequestered annually through the many Great Green Wall projects and programmes. It will become one of humanity’s largest carbon sinks and an example of significant regional climate action.

Naturally, investments will be required. Secure access and tenure for land will be crucial, as will credit for investment

by smallholder farmers. Financing larger-scale initiatives to help close the carbon emissions gap could be done using mostly private-public partnerships supported by appropriate investment platforms. The proposed Land Degradation Neutrality Fund could raise 2 billion annually to enable the rehabilitation of 12 million ha of degraded land a year. This would add up to nearly 200 million ha of regenerated land by 2030 with multiple co-benefits, including “green” revenue for investors and land owners, increased food and water security, and carbon sequestration.

Land is, uniquely, both a source of emissions and a sink for them. We should exclude no one and no sector from a comprehensive response to climate change. Everyone and each sector has a unique role to play and there are significant untapped opportunities. Pledges to scale up low-emission agriculture, integrated landscape management and ecosystem restoration must be transparent and commensurate with countries’ mitigation potential.

All countries, even those with relatively low levels of emissions, can contribute to global goals while enjoying local benefits. Only by bringing everyone to the table will we be able to fill in the missing piece of the climate puzzle. In the post-2015 world, the health and productivity of the ground on which we stand will largely determine the future course of human sustainability, prosperity and security. ▲

Nurjahan Begum

Sunny Smiles

Solar rooftop panels have brought happiness to millions of homes in thousands of villages across Bangladesh



Nurjahan Begum

*Managing Director,
Grameen Shakti,
Bangladesh*

When the sun sets in Bangladesh, thousands of villages really do go dark, since they do not have access to electricity. Although 62 per cent of the population is now connected to national electrical grids, the rest (mostly living in rural areas) still depend on kerosene-fueled lamps and lanterns for energy every day. The dirt and black smoke emitted by these devices do not make the villagers feel any better. Indeed, burning fossil fuels, especially kerosene, creates health hazards for millions of Bangladeshi women and children.

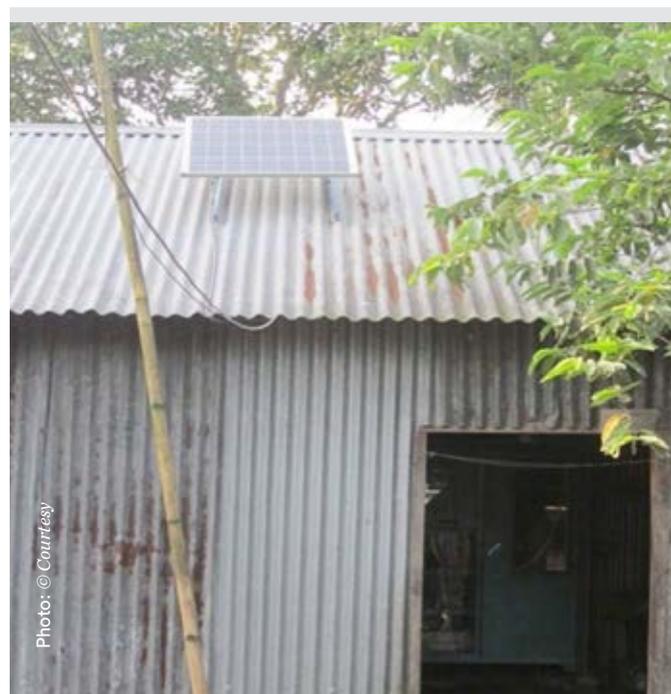
With the introduction of solar energy, however, the situation is changing. The Solar Home System is transforming the lives of people by replacing kerosene, around 100 litres of which is used by an average household in the country every year. When customers install a Solar Home System in their houses, they can recover the money that was used to buy it, while protecting health and the environment.

In Bangladesh, about four million Solar Home Systems have been installed under the Rural Electrification Programme. The programme is run by the state-owned organization, Infrastructure Development Company Limited, which works with 47 partners. Grameen Shakti, the largest of these partners, has installed more than 1.6 million systems, at a rate of 15,000 a month. A customer-friendly financial scheme called “Sale on Credit” has enabled the programme to reach thousands of rural households every month. We are doing social business with rural people whose livelihood mostly depends on agriculture, which itself is impacted by climate change.

While exploring solar power in different sectors, several Bangladeshi government agencies have come forward—along with donors—to operate more and more solar irrigation

pumps and solar mini-grids. Irrigation pumps run by solar power replace diesel-based ones, helping to save both money and the environment. Mini-grids connect clusters of houses, whose inhabitants repay in monthly bills like city dwellers.

This Solar Home System project is now a registered Clean Development Mechanism (CDM) through the United Nations Framework Convention on Climate Change. Bangladesh has received around 395,000 CERs (Certified Emission Reductions) as recognition for this successful project. We believe this huge achievement will give scope to developed countries to invest more in potential CDM projects.



Dirt and black smoke emitted by kerosene-fueled lamps and lanterns create health hazards for millions of Bangladeshi women and children.

Although **62 per cent** of the population is connected to national electrical grids, the rest still depend on kerosene-fueled lamps and lanterns for energy.

As non-renewable energy sources are depleted and demand for energy increases, time is already knocking on the door to demand that we switch from our fossil fuel economy to one based on renewable energy. Countries like Bangladesh, which is susceptible to climate change, need a comprehensive programme for disseminating renewable energy technology at affordable costs in collaboration with developed countries.

This case study illustrates how peoples' lives have changed for the better in off-grid parts of Bangladesh.



While exploring solar power in different sectors, several Bangladeshi government agencies have come forward—along with donors—to operate more and more solar irrigation pumps and solar mini-grids.



Arifa Akter is a 14-year-old grade VIII student in Singair Girls' School in the Manikganj District of Bangladesh. She is now also able to study well at night thanks to solar-powered light. Not long ago, she had to spend 30-45 minutes every afternoon cleaning three kerosene lamps. Now she does not have to spend a single second taking care of arranging light. Arifa's father, Ali Hossain, purchased a 65 Wp Solar Home System (SHS) from Grameen Shakti on 21 April 2014 on credit. He has agreed to pay the loan back in 36 monthly installments under a customer-friendly financial scheme that has enabled many villagers across the country to be owners of a SHS.

Ali's family is very happy now and says the family's lifestyle has changed. They can do all kinds of household works properly, and when necessary under solar powered light, and the LED-lit kitchen is now more user-friendly. His two children can now study till 10 p.m. without any disruption: Ali feels happy when he finds them studying without any vision problems. They can also watch television: indeed, many children in the neighbourhood come to their house to watch cartoons on television, while adults come to watch other programmes. Ali has also placed an LED light in the attached cattle-farm for security.

The family can also enjoy the comfort of a solar powered ceiling fan during hot days and nights. Grameen Shakti's Solar Home Systems have made thousands of households, like Arifa and her family, happy over the last 18 years. ▲

Ulrich Spiesshofer

Reinventing Edison

Revolutions in transmitting electricity from renewable sources are bringing a low-carbon future ever nearer



Ulrich Spiesshofer
CEO of ABB Ltd

If Thomas Edison came back to life he would recognize few of today's technologies, except the light bulb and the power grid. The power supply system he helped to develop has served us well for more than a century. It is beginning to show its age, however, amid rapid change in both the supply and demand of electricity.

On the supply side, concern about climate change has stimulated the development of renewable sources of energy to reduce pollution from burning fossil fuels. Today, renewables account for an increasing share of the energy mix. In some countries, they make an important contribution to meeting ambitious carbon reduction targets.

On the demand side, electricity is displacing traditional forms of energy as populations become more urbanized, and lifestyles and technology evolve. The modern, digital economy is driven by cities, where growth and quality of life is increasingly determined by infrastructure, clean public transport and air quality, all of which depend on access to electricity.

These trends at both ends of the power system are stretching grids to their limits. And because the power supply is the main source of greenhouse gas emissions, simply expanding the grid is not a solution. We need to create a sustainable electricity system, if we are to turn the tide on emissions.

The challenges are greatest on the supply side. The intermittent nature of solar and wind energy can lead to potentially sharp fluctuations in the amount of electricity they generate. Furthermore, the best sources of renewable energy, such as

valleys that can be dammed and offshore locations where the wind blows strongest, are usually far from the megacities and industrial clusters that are the biggest users of electricity.

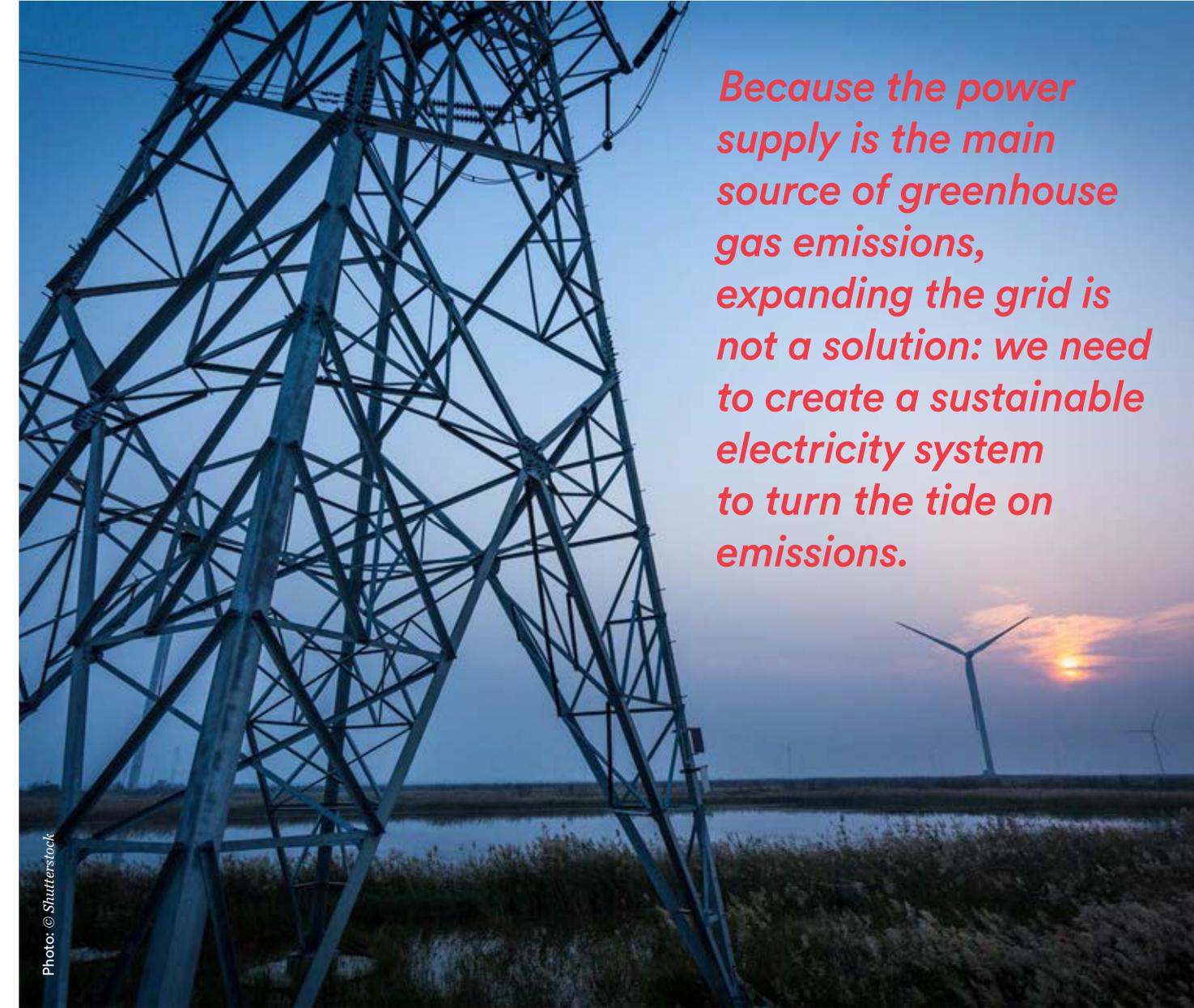
Fluctuating output from renewables, and their geographical dislocation, were for years insurmountable obstacles to integrating larger amounts of renewables into conventional power grids. However, technological innovation—driven by the need to tackle the climate challenge—is now producing viable solutions.

The enabler for transmitting electricity over long distances has been high-voltage direct current (HVDC) technology. Developed by ABB 60 years ago, HVDC has progressively become more powerful and efficient over the decades. At the same time, we have grown into a \$40-billion power and automation technology company that helps utility, industry, and transport and infrastructure customers to improve their performance while lowering environmental impact.

These high-voltage systems have been widely adopted in energy-hungry countries with rich but under-exploited renewable energy resources, most notably China. In recent years, China has broken one technological record after another for transmitting ever larger amounts of electricity over longer and longer distances. The latest projects, announced by ABB in October, are two new ultrahigh-voltage links, each able to transmit 8,000 megawatts of wind and solar power—enough electricity to meet the needs of 26 million Chinese consumers.

More recently, India has started to accelerate the development of its power grid. It has recently achieved a major construction milestone—and a technological world first—with an electricity “superhighway”. It supplies clean hydro-electric power from the Himalayas to Agra, serving 90 million people across the populous northeast. ABB energized the first phase of this power link in September.

At the other end of the spectrum are distributed electricity sources called micro-grids, which are ideal for bringing



Because the power supply is the main source of greenhouse gas emissions, expanding the grid is not a solution: we need to create a sustainable electricity system to turn the tide on emissions.

Photo: © Shutterstock

*Two new ultrahigh-voltage links announced by ABB in October can each transmit **8,000 megawatts** of wind and solar power—enough electricity to meet the needs of 26 million Chinese consumers.*

power to remote communities, such as islands or off-grid rural villages. Powered by a handful of wind turbines or a small-scale solar farm, micro-grids are quick to build. They can therefore be used to power communities that would otherwise have had to wait years or even decades for a grid connection. Such grids usually have to rely on diesel generators to provide power when the wind stops blowing or the sun goes down. But advances in battery storage technology are limiting the use of such generators. Eventually, such technology is expected to store enough power so that grids can be run entirely on renewables.

ABB's experience of both distance-defying energy super-highways and far more modest micro-grids demonstrates the immense scope for integrating clean power from renewables into our electricity grids and managing the growing complexity on the supply side. For a truly sustainable electricity system, however, society also needs to cut consumption by using energy more efficiently.

The potential of energy efficiency to relieve pressure on the grid is immense. In industry alone, tens of millions of electric motors operate machines, fans, pumps, compressors, conveyor belts and so on.

Together, they account for about 28 per cent of global electricity consumption. Devices called drives, which adjust the speed of electric motors to match the actual demand of an application, reduce motor energy consumption in most cases by 20-50 per cent. The drive units delivered by ABB in just the last two years have saved about 850 terawatt hours, equivalent to the power consumed annually by all households in the European Union.

Existing technology can ensure our electricity is generated with as few emissions as possible, delivered to the consumer with minimal wastage and used efficiently. What is needed to take our energy supply to the next level is a policy environment that drives and encourages the use of these technologies. Crucially, we need policies that encourage investment in renewable power generation; phase out subsidies for fossil fuels; and support the take-up of technologies that reduce energy consumption and increase the reliability and resilience of electricity system.

In short, if we are to meet the climate challenge, we need to decouple economic growth from environmental impact. The key to doing so lies in reinventing Edison's electricity system. ▲

UNEP at Work

Financing the Transition

Taking action on the 4Rs of system reform will move the world towards a low-carbon, resilient and sustainable global economy



Photo: © Tetra Images / Robert Harding Pictures

Harnessing the financial system is essential if we are to make a successful transition to a low-carbon, resilient and sustainable global economy. Climate change brings a three-fold imperative for the more than \$300 trillion in assets that make up the financial system. First, investment in low-carbon solutions (particularly energy efficiency) has to be scaled up to the tune of over \$1 trillion per year.¹ Second, investment needs to be shifted away from high carbon assets: Citigroup has estimated that the value of unburnable fossil fuel reserves could amount to over \$100 trillion by 2050.² And third, financial innovation is urgently required to strengthen the resilience of communities to climate shocks: in the world's poorest 100 countries, less than 3 per cent of the population is served by effective insurance protection against natural hazards.³

Overcoming these challenges requires a systemic response combining both market and

policy innovation. In January 2014, building on its longstanding partnership with the banking, insurance and investment sectors through the UNEP Finance Initiative, UNEP established an Inquiry to identify policy options that would strengthen the alignment between the financial system and sustainable development. Clearly, mobilizing capital for the transition will require action in the real economy to price natural capital, remove perverse subsidies and introduce ambitious sectoral policies to attract sustainable investment into energy, buildings, industry and agriculture. Public finance is also essential,

particularly in terms of international flows of funding to support action in developing countries. Reforms within the financial system are also needed to complement these key strategies—and the task of the Inquiry was to identify steps being taken by financial system rule-makers such as central banks, regulators and standard-setters to incorporate sustainability factors into the fabric of the financial system.

What the Inquiry found was a “quiet revolution” in policy and practice, captured in its global report, *The Financial System We Need*.⁴

The tasks for financial system reform in the face of climate change can be summarized as the 4Rs of capital raising, enhanced responsibilities, strengthened risk management and systematic reporting.



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Mobilizing capital for the transition will require action in the real economy to price natural capital, remove perverse subsidies and introduce ambitious sectoral policies to attract sustainable investment into energy, buildings, industry and agriculture.

Twenty-seven of the world's leading stock exchanges are now working together to include sustainability into their listing requirements for companies.⁵ Sixteen banking regulators from across the developing world are incorporating social and environmental factors into risk management. And regulators across 14 jurisdictions now require pensions funds to disclose information on their approach to environmental, social and governance (ESG) issues. As Mark Carney, Governor of the Bank of England commented recently, "green finance cannot conceivably remain a niche interest over the medium term."⁶

Looking ahead, the tasks for financial system reform in the face of climate change can be summarized as the 4Rs of capital raising, enhanced responsibilities, strengthened risk management and systematic reporting.

1. Capital Raising: Considerable financial innovation will be required to mobilize the sums required for the transition. A critical arena are the world's \$100 trillion debt capital markets, where issuance of "green bonds" grew three-fold in 2014 to \$36 billion; this

is set to be exceeded in 2015. New voluntary principles and standards are emerging to ensure market integrity. With the Climate Bonds Initiative, the Inquiry has highlighted 10 steps that policymakers can take to expand the green bond market.⁷

2. Enhanced Responsibilities: Greater clarity is also needed on the responsibilities of financial institutions for managing sustainability factors. In the investment world, a landmark report on global practice published this year concluded that "failing to consider long-term investment value drivers, which include ESG issues, in investment practice is a failure of fiduciary duty."⁸ More broadly, sustainability needs to be embedded in the values, incentives and skills that drive financial culture.

3. Risk Management: Leading banks, insurers and investors are intensifying the ways in which they respond to climate risks. For example, the Portfolio Decarbonization Coalition has brought together institutional investors seeking to cut carbon emissions in \$100 billion of assets by COP21.⁹ Policymakers can help to strengthen this trend by encouraging the use

of sustainability stress tests—assessments of the impacts on financial assets and institutions of a range of environmental factors, such as air pollution, carbon emissions, natural hazards and water stress.¹⁰ France is the first country to announce that it will include climate factors into the routine stress tests for its banking sector.

4. Systematic Reporting: Better flows of information underpin all of these tasks, enabling consumers to pick the right financial products, investors to make informed choices and regulators to assess the threat to the resilience of the financial system from climate disruption. One of the key developments in 2015 has been the decision by the Financial Stability Board to propose a new climate disclosure task force. This will take stock of existing practice, identify the needs of users of climate information and potentially develop common disclosure principles.¹¹

Taken together, these steps will not just help to ensure a smooth transition to a climate-secure economy, but could also contribute to the efficiency and effectiveness of the financial system as a whole.

Florian Bieberbach Going Green

Munich is well on its way to providing all its electricity and heat from renewable sources



Florian Bieberbach
Chief Executive Officer
of Stadtwerke München

Munich is pursuing the ambitious goal of halving carbon dioxide emissions by 2030 compared to 1990, and has already achieved a 33 per cent reduction. Successful implementation of the City's CO₂ objectives depends primarily on expanding renewable energy. The plans of its municipal energy and infrastructure company Stadtwerke München (SWM) for such expansion – with regard to both power and heat supply – play a key role.

SWM is one of the largest energy and infrastructure companies in Germany. Every day, it serves over one million private households, small and medium-sized enterprises, and business clients with electricity, natural gas, district heating, drinking water, 18 indoor and outdoor swimming pools, underground, bus and tram systems and cutting-edge telecommunication services with an optical fibre system.

In 2008, the city—a member of the Climate Alliance – set SWM a target of meeting the energy demand of Munich's private households, subways and trams from green electricity generated in its own plants by 2015. By 2025, it is to cover the energy demand of the entire municipality of Munich in this way. So SWM launched a Renewable Energies Expansion Campaign in 2008 to achieve these goals with a budget of EUR 9 billion.

It has reached its first target on time. Since May 2015, SWM plants have fed as much green energy into the grid as is consumed by all the city's private households and its electrically powered public transport system put together. This is – an important step towards “100 per cent green electricity for Munich”.

Once other ongoing projects have been realized and have come on stream, SWM will have a green energy generation capacity of over 3.5 billion kilowatt hours (kWh) from its own plants, equivalent to half of Munich's power consumption. From the outset, the company has focused on cost-efficient projects that are self-sustaining. We started with projects in various technologies, like hydropower, geothermal energy, solar and biomass, but today wind power is playing the key role in our strategy.

Three offshore wind farms in which SWM has a stake were commissioned in 2015. Its share of green power from these farms alone meets the annual consumption of well over 600,000 Munich households. A large onshore wind farm also went into regular operation at the end of August in Sweden, which generates enough clean electricity for about another 160,000 Munich households.

The German debate on the success of the energy transition now primarily focuses on electricity. To date, heating has been unjustly neglected—including by politicians—although it comprises the biggest category of energy consumed in Germany. The country's heating accounts for around 40 per cent of total energy consumption and around 90 per cent of the energy consumed by residential households is used on space heating and hot water supply.

SWM has one of Europe's largest district heating systems, mostly using combined heat and power plants. These systems are very fuel-efficient, but are still based on fossil fuels. The company has developed a vision to decarbonise the heating market: by 2040, Munich is to become the first German city with district heating entirely provided from renewable energy



Photo: © Shutterstock

*Germany's heating accounts for around **40 per cent** of total energy consumption, while some **90 per cent** of the energy consumed by residential households is used on space heating and hot water supply.*

sources. Geothermal energy will make the main contribution here, thanks to Munich's favourable location in the Bavarian Molasse basin. A huge amount of hot water lies deep down beneath the city, and the company is gradually tapping this potential.



Photo: © Shutterstock

The German debate on the success of the energy transition primarily focuses on electricity. To date, heating has been unjustly neglected, although it comprises the biggest category of energy consumed in the country.

Geothermal energy has long been successfully deployed in the Munich district of Riem —where SWM's first geothermal plant went into operation in 2004— and in the municipality of Sauerlach, south of the city. Hot water over 90°C from 3,000 metres beneath the surface meets the heating requirements both of many private homes in Riem and of its "Neue Messe München" exhibition centre. The water temperature is significantly higher in Sauerlach, enabling SWM to generate power for 16,000 households at a geothermal combined heat and power station. This station, officially commissioned at the start of 2013, simultaneously produces heat for households in the municipality.

Drilling has just started for the next project, a geothermal plant in the Munich district of Freiham. The plant will supply Freiham and neighbouring areas with eco-friendly heating beginning next year. More geothermal plants will follow.

SWM also stands in good stead in implementing its vision of "District heating supplied entirely from renewable energies": requirements for heating will gradually decline over the long-term thanks to energy saving and energy-efficiency measures, such as renovating buildings, while those for hot water will remain relatively constant.

As an energy partner for Munich and the region, SWM has always supported residents adopting an efficient approach to energy, and thereby saving valuable resources and money. Energy advice for tenants and home owners is provided at the City's "Bauzentrum", at the customer care centre and online. The company together with Munich's major charities has also been providing free energy advice to low-income households since 2009. This helps people who have to get by on little to reduce their energy costs, while contributing its share to Munich's ambitious move to a low-carbon economy. ▲

Sarah Butler-Sloss

Blazing the Trail

Hosts of innovative small and medium-scale enterprises are bringing clean energy to tens of millions of the powerless, and must be supported



Sarah Butler-Sloss
*Founder Director of
Ashden*

If we are really going to limit global warming to 2°C, it is essential to identify and invest in the next wave of sustainable energy pioneers and innovative trail blazers. Over the past 15 years, the Ashden Awards have rewarded and supported pioneers in sustainable energy—from solar-powered micro-grids in Africa to low-carbon building innovators in the United Kingdom.

Our award winners are already transforming the lives of more than 50 million people across the world. In developing countries and emerging economies they are bringing light, power and clean cooking to communities for the first time through affordable renewable energy. This, in turn, is fundamental to help reduce poverty, improve health and education, address gender inequality, increase productivity and promote economic growth.

Take the Sarhad Rural Support Programme in Northern Pakistan, one of this year's winners. It has built 189 micro-hydro schemes in little more than a decade, bringing clean energy to around 365,000 people and transforming communities in the process. The resulting electricity is making studying easier and health care safer. At the same time, access to power is enabling a multitude of new businesses to start up—from flour mills to hotels to information technology centres.

Hydro power is delivering these same benefits in North East Afghanistan through a 2012 winner—the German

government development enterprise GIZ and consulting engineers INTEGRATION. In addition, the project is bringing fractious communities together, providing education facilities for women and generating new businesses and jobs that replace growing opium.

Meanwhile, the last ten years have seen a remarkable drop in the cost of renewable energy technologies. Solar PV is now one-sixth of its cost in 2007, battery costs have more than halved and huge improvements in energy efficiencies, such as LED bulbs, are allowing power to go much further.

Combine this with the mobile phone revolution in Africa and an enormous potential for access to energy is opening up. Some 66 per cent of the continent's people now own a mobile phone—up to 89 per cent in such countries as South Africa and Kenya. East Africa is making the most of this trend, emerging as a hotbed of creative solutions.

Mobiles are increasingly used to transfer funds to pay for clean electricity. Off Grid Electric, an Ashden winner last year, is a leader in Tanzania, using mobile money to sell solar power as a daily service to off-grid homes at an affordable price. Their pay-as-you-go service is tailored to user needs, with flexible payments, an opportunity to change service level and support from a customer care team and local agents. These qualities combine with a sophisticated app-based customer registration and product tracking system.

In neighbouring Kenya—80 per cent of whose people lack access to mains electricity—winner SteamaCo is using similar digital developments to bring the benefits of clean energy through solar powered micro-grids.

These work like mini power stations for entire villages, supplying enough electricity to run small businesses, as well as to power TVs, radios and bright lights in the home. It uses a cloud-based remote metering and payments system that



Photo: © Sergio Pitamitz/Robert Harding Library

Small and medium-sized enterprises, which are in the vanguard of delivering clean energy to those who need it most, need access to finance that will enable them to scale up and reach many more millions.

Solar PV is now **one-sixth of its cost** in 2007, battery costs have more than halved and huge improvements in energy efficiencies, such as LED bulbs, are allowing power to go much further.

monitors energy use, lets users pay through their mobile phones and quickly troubleshoots problems.

Such small and medium-sized clean energy enterprises are bringing huge social and economic benefits. While they are in the vanguard of getting energy access to those who need it most, they need access to finance that will enable them to scale up and reach many more millions.

A Christian Aid report found that financing was enormously difficult in the early stages for these enterprises.

They need working capital and grants focused on growth, new programmes and innovation. There is great potential in blended finance that combine public, private and philanthropic sources. But these and other mechanisms desperately need to be developed and expanded.

End-user finance to help customers purchase energy products is just as critical. In Asia—the birthplace of micro-finance—2008 winner Grameen Shakti in Bangladesh deploys the one-shop-stop model. It provides technology, after-sales service and end-user finance tailored to the specific needs of clients under one roof.

The Shri Kshethra Dharmasthala Rural Development Project, an Ashden Award winner in South India, provides affordable loans to families, helping them to buy such

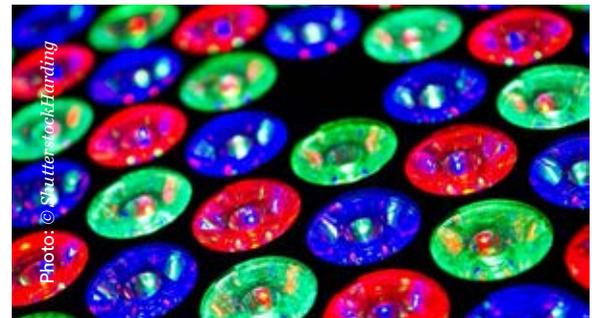


Photo: © Shutterstock/Robert Harding

renewable energy goods as biogas plants, solar home systems and cookstoves. Self-help groups that help people plan their household needs—and make informed choices on what energy products to buy—are a key ingredient of its success. However, with the mobile money developments in Africa, the real innovation in end-user finance is the pay-as-you-go model.

The Paris Summit requires a high level of ambition and strong international coordination and collaboration. This can help ensure that investment in the right kind of energy infrastructure promotes sustainable growth and development. It now makes financial sense to be investing in renewable energy rather than fossil fuels, and in different models of energy infrastructure. The decentralised model is the essential, cost-effective way to bring modern energy services to those communities that lack them across Africa, Asia and beyond. ▲



Changing Finance for a Climate Resilient World

Investors play a critical role in today's global economy. The good news is they are helping accelerate the transition to a low-carbon economy.

Over the past few years, many investors have begun to engage on climate change issues with their investee companies. They want to bring about corporate behavioral change, thereby reducing private sector emissions and shifting corporate capital towards emissions-reduction activities. With growing awareness of the scale of capital needed for a transition to a low-carbon economy, a number of important investor initiatives have been launched to facilitate that deployment and build markets for low-carbon alternatives.

There has been significant movement in this space over the past year, particularly in the run-up to COP 21 in Paris, where the world's governments will be negotiating a new climate agreement this coming December. The global investor groups have collated a registry of low carbon investments (<http://investorsonclimatechange.org>); nearly 400 investors representing over \$24 trillion in assets have signed the Investor Statement on Climate Change, demanding greater action from their governments; the Montreal Pledge is encouraging investors to measure and disclose the carbon footprint of their equity portfolio on an annual basis; and the green bond market is expanding rapidly.

Increasingly, mainstream investors are committing to disclosing their own climate performance and the carbon footprints of their portfolios. Some are going even further, by setting portfolio decarbonization targets. Their reasoning is that by taking action now, they can anticipate the risks that are likely to unfold in future. The UNEP Finance Initiative, together with CDP, is helping catalyze such action.

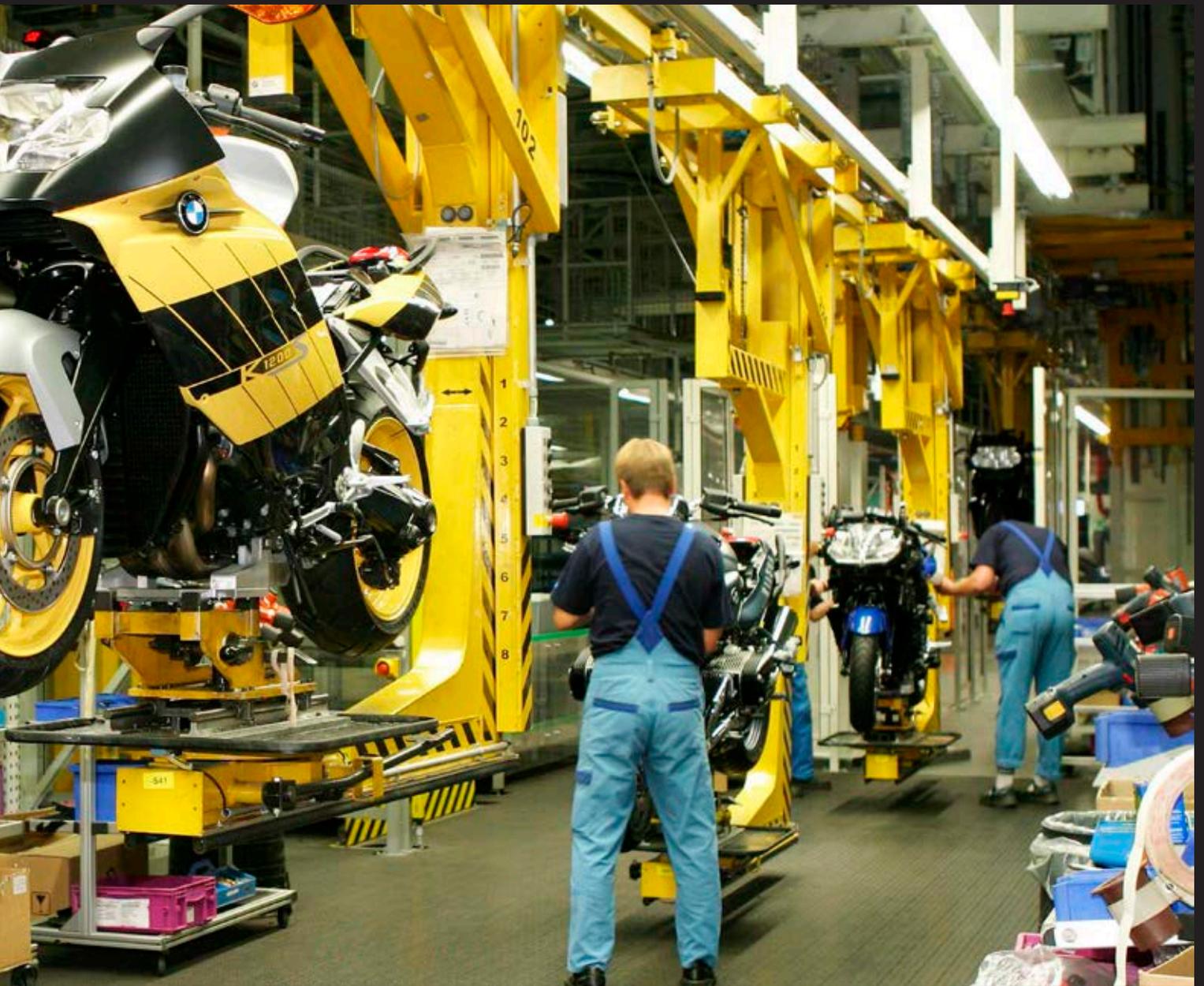
The Portfolio Decarbonization Coalition (PDC) was co-founded in 2014 by the United Nations Environment Programme (UNEP) and its Finance Initiative (UNEP FI); the fourth national pension fund of Sweden (AP4); Europe's largest asset manager Amundi; and CDP, the most important mechanism for climate disclosure worldwide. PDC aims



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Photo: © Akimov Igor / Shutterstock



to bring together leading investors to share ideas and experiences of driving greenhouse gas emission reductions by committing to gradually decarbonizing their portfolios. As a first step, investors are encouraged to measure and disclose, via the Montreal Pledge, the carbon footprint of their investment portfolios on an annual basis. However, members of the PDC commit to taking action to decarbonize their investment portfolios in any way they choose.

Portfolio decarbonization refers to systematic efforts by investors to align their investment portfolios with the goals of a low carbon, climate-resilient economy. It includes, but is not limited to, efforts to reduce the carbon footprint of investment portfolios; to increase investment in areas such as renewable energy, energy efficiency and clean technology; to withdraw capital or reduce investments in fossil fuels or other high-energy consumption activities; and to encourage companies and other entities to reduce their own emissions. PDC members have adopted a range of these strategies.

While the specific impacts depend on the strategies adopted, decarbonization activities have resulted in reduced carbon emissions, reduced exposures to fossil fuels and increased investments in low carbon technologies and industries of the future. Perhaps the most significant conclusion to be drawn from the PDC's first year is that, far from damaging investment returns, PDC members see

portfolio decarbonization as a strategy that is likely to enhance long-term investment performance.

Decarbonization can also enable investors to reduce the risk of valuation impairment or stranded assets as a result of regulation, and to increase their exposure to the winners of the energy transition. In fact, for many of PDC's asset owner signatories, identifying and managing the investment risks and opportunities associated with climate change is an integral part of the fiduciary duties that they owe to their beneficiaries.

A critical mass of institutional investors—both asset owners and asset managers—will bring the investment chain together. Joint commitments to decarbonize their portfolios will send a strong and unequivocal message to policymakers and to companies. It says that decarbonization is now a core concern for institutional investors, and that investors are looking to them to help accelerate the transition to a climate resilient economy.

In addition, by offering a platform for these leading action-oriented investors to work together, the PDC aims to stimulate and catalyze further decarbonization efforts. The PDC's goal is to decarbonize \$100 billion in institutional investment across asset classes, and the initiative is on track to meet this goal in time for COP 21 in Paris this December.

Rajendra Singh

Rejuvenating Rivers

Experience shows that when water is enabled to flow again, and the land is restored, other problems also get solved



Rajendra Singh

Member of the Flow Partnership and winner of the 2015 World Water Prize

Experience has taught us that when we look after water at the source and collect it upstream in the hills where the rain falls, then the flow of rivers is restored, even in a desert region. At the same time, this also decreases the rate of flow after heavy rains, preventing floods. Holding the water in the landscape—as has been known for millennia—relieves both droughts and inundations. Ayurveda, the traditional health system for people, teaches that prevention is better than cure, even in the case of maintaining the health of our landscapes.

The modern engineering mindset erroneously assumes rainwater to be a waste product to be drained quickly from urban areas. At the same time, massive amounts of needed precipitation are lost by poor agricultural and forest land management. Deforestation reduces the ability of the land to hold moisture, as does the manmade proliferation of impervious surfaces, especially in cities.

Poor grazing management and aggressive tillage in rural areas causes soil erosion and excess drainage. On a continental scale, such local actions together significantly reduce groundwater, moisture for soil and vegetation, and water vapor in the air. This drying up of ecosystems results in undesirable climate change, including extremes of flooding, drought, heat, cold and chaotic air currents.

The untold heartache of dealing with the devastation of floods and droughts can be avoided by adopting simple and successful interventions upstream. Engineers and hydrologists know of them and how to build them, but they fail to involve civil society in their actions. When technology and

communities come together, anyone can do this water work and restore the health of their landscapes successfully.

When rivers rejuvenate, so do all aspects of nature and community life. The seven rivers we have helped revive in Rajasthan have brought water to abandoned villages, enabling them to be re-settled. Bare, brown earth has become lush, green, fertile and productive, and the local climate has changed, producing much-needed rain. Biodiversity has increased: a restored nature reserve has filled up with tigers and other animals. The natural cycle of existence has been able to re-establish itself and young people have returned to the villages from the towns. By rejuvenating rivers, we were able to transform nature, agriculture, communities and even the climate throughout the region!

It was a change of emphasis from control and profiteering to an organic relationship between the community and nature. Water is at the heart of everything, whether we exploit it to make products or whether we live with its power to support whole communities thriving in harmony with nature. Of course technology can provide us with solutions, but it cannot absolve us from responsibilities. When people come together in a spirit of community, water can flow naturally. And when that flow is restored, everything else gets restored, too. If we combine conservation and harvesting with disciplined water use, problems are solved.

What if we had in place a strategy for the world so that every community had access to the knowledge, tools, wisdom and finance to look after their own water resources?



Photo: © Michael Runkel/Robert Harding Library

Water is at the heart of everything, whether we exploit it to make products or whether we live with its power to support whole communities thriving in harmony with nature.

Some 10,000 small dams have been built, and six more rivers have been revived in the region. More than three million people have benefited.

We can implement such a strategy applicable to every water-stressed region in the world, giving communities the wherewithal and responsibility to restore their regions' natural water-holding capacity.

Water Comes First

Twenty-one years ago, Rajendra Singh arrived in the arid Alwar district of Rajasthan, India, with a similarly idealistic group of friends, aiming to educate local children and provide medicine to the villagers. But the children simply did not have the time; they were too busy helping their mothers gather fuelwood and water—tasks that could take 6 to 18 hours a day.

A village elder then pointed out the true priority to him. “If water is provided”, he said, “all other things will inevitably follow”. He added that, as an outsider, “you are not related to anybody, so you are related to everybody”. Thus he could overcome paralyzing village family feuds to bring attention and action to do the needed water work. He taught Singh how to build small traditional dams to catch what water fell when the rains came.

The trouble was that all the young men of the area had left to try to find work. The women, children and old people remaining neither had the time nor energy to build dams, nor were convinced of their usefulness. So Singh, working alone for a long while, constructed the first dam with almost no resources and marginal help from the villagers.

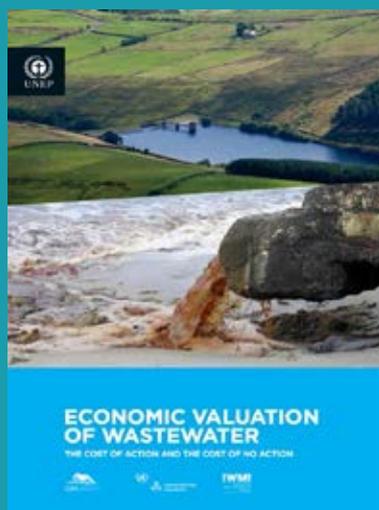
Fortunately, the rains were good the following year: the dam filled up, and the village had enough water for the first time anyone could remember. The idea caught on, and dam building began in earnest, deliberately sited over geological faults in order to help recharge groundwater reserves. Wells saw their water levels rising (one by over 30 metres). Twelve years and 600 dams later, the long dried-up River Aravari began to flow perennially again. Seventy-two local villages, along the river, then set up a river parliament to manage and protect their watershed.

Now some 10,000 small dams have been built, and six more rivers have been revived in the region. More than three million people have benefited as the amount of cultivated land has doubled and yields have increased up to fivefold, with corresponding increases in incomes. Conflicts have diminished; self government has increased as water parliaments spread; and education, especially for girls, has flourished.

Water harvesting is a hard, but fulfilling challenge in which the whole global community should be involved. We need to transform the whole relation of life to water—from a free resource that we squander, into a precious, life giving gift of nature that we serve—and not just at community level, but nationally, internationally and globally. ▲

Written with Philip Franses, Michal Kravcik, Jan Lambert and Minni Jain of The Flow Partnership.

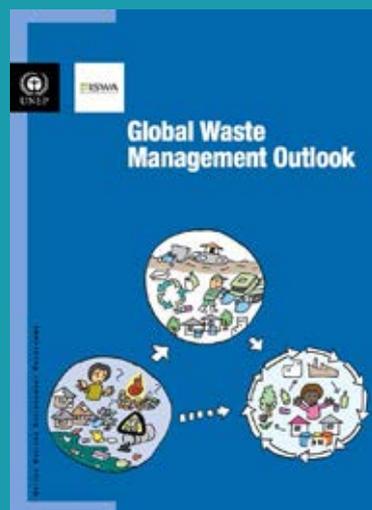
UNEP Publications



Economic Valuation of Wastewater: The Cost of Action and the Cost of No Action

This book presents the results of an analytical study on the economic valuation for wastewater, comparing the cost of no action versus the cost of effective wastewater management. Although economic valuation of wastewater management is complex, it remains an important tool to guide policymakers and investors to take informed decisions. A financial analysis of wastewater management looks at its private costs and benefits and can underpin decision making from a business or treatment plant operator standpoint.

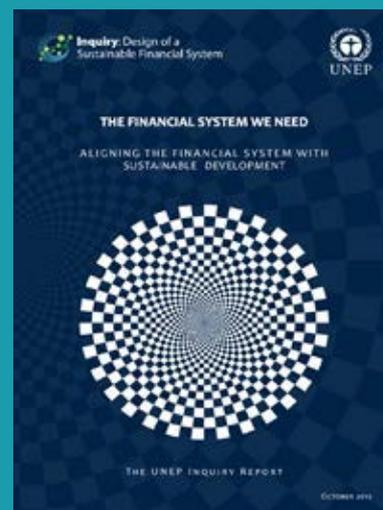
Economic analysis looks at the broader costs and benefits for society, providing information for public policy decisions to support improvements in wastewater management. Adequate wastewater collection, treatment, and safe use or disposal can lead to significant environmental and health benefits. However, because some of these benefits do not have a market price, they have not traditionally been considered in the financial analysis of wastewater treatment projects, therefore underestimating total benefits.



Global Waste Management Outlook

The Global Waste Management Outlook, a collective effort of the United Nations Environment Programme and the International Waste Management Association, is a pioneering scientific global assessment on the state of waste management and a call for action to the international community. Prepared as a follow up to the Rio+20 Summit and as a response to UNEP Governing Council decision GC 27/12, the document establishes the rationale and the tools for taking a holistic approach towards waste management and recognizing waste and resource management as a significant contributor to sustainable development and climate change mitigation.

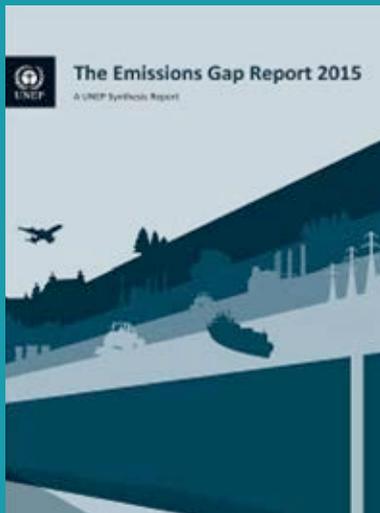
To complement the Sustainable Development Goals of the Post-2015 Development Agenda, the Outlook sets forth Global Waste Management Goals and a Global Call to Action to achieve those goals.



The Financial System We Need: Aligning the Financial System with Sustainable Development

The global report of the UNEP Inquiry argues that there is now a historic opportunity to shape a financial system that can more effectively finance the development of an inclusive, green economy. This opportunity is based on a growing trend in policy innovation from central banks, financial regulators and standard setters, who are incorporating sustainability factors into the rules that govern the financial system.

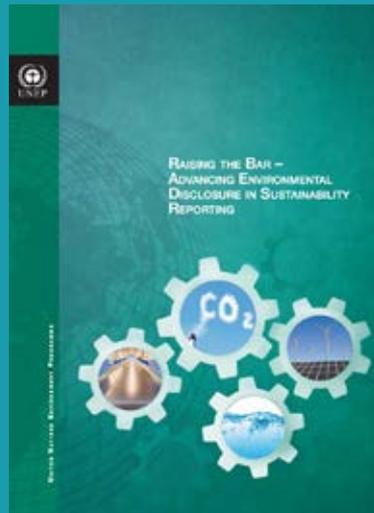
The report draws together practical examples of policy changes in banking, capital markets, insurance and institutional investment, drawing on detailed work in countries such as Bangladesh, Brazil, China, Colombia, France, India, Indonesia, Kenya, South Africa, the UK and the USA. It offers a Framework for Action that shows how a systematic approach can now be taken at both the national and international levels.



The Emissions Gap Report 2015

The year 2015 has the potential to become a turning point in global efforts to transform the prevailing social and economic development paradigm into a more sustainable one. The global community reached agreement in September 2015 on a set of 17 sustainable development goals to be achieved by 2030, including climate change.

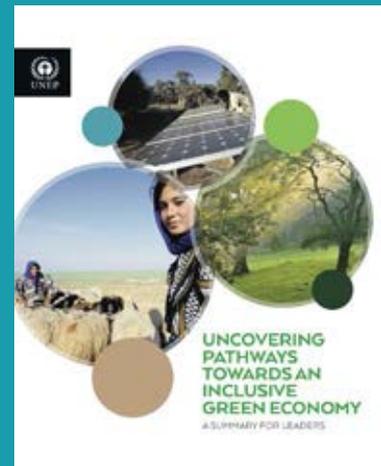
Countries will meet again at the United Nations Framework Convention on Climate Change (UNFCCC) 21st Conference of the Parties (COP 21) in Paris with the aim of establishing a new global agreement on climate change, hereafter the 'Paris Agreement', with the ambition of limiting changes in global temperatures to below 2 °C or 1.5 °C warming in 2100 compared to pre-industrial levels.



Raising the Bar - Advancing Environmental Disclosure in Sustainability Reporting

This global cross-sector report assesses the environmental dimension of sustainability reporting and provides recommendations to make environmental reporting relevant to all stakeholders.

It analyses what the key and most common environmental disclosure items are and provides practical recommendations for companies and other reporting organizations on how these items should be measured and reported, supported with best practice examples.



Uncovering Pathways towards an Inclusive Green Economy: A Summary for Leaders

An Inclusive Green Economy (IGE) has evolved from earlier work on Green Economy. In its simplest expression, such an economy is low carbon, efficient and clean in production, but also inclusive in consumption and outcomes, based on sharing, circularity, collaboration, solidarity, resilience, opportunity, and interdependence. It is focused on expanding options and choices for national economies, using targeted and appropriate fiscal and social protection policies, and backed up by strong institutions that are specifically geared to safeguarding social and ecological floors. And it recognizes that there are many and diverse pathways to environmental sustainability.

This paper speaks to the multiple benefits – economic, health, security, social and environmental – that such an approach can bring to nations, mindful of the differing challenges faced by states along the development continuum, be they developed, developing, emerging, or in conflict. It argues for policies that are nuanced, context-dependent, and modulated.

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www.unep.org/publications

Beate Sonerud Sean Kidney Towards the Trillions

Green bonds—which both help combat climate change and provide good returns to investors — are catching on around the world and need to be encouraged



Beate Sonerud

Policy Analyst, Climate Bonds Initiative



Sean Kidney

CEO, Climate Bonds Initiative

Climate change mitigation and adaptation present huge challenges for infrastructure projects. Even at the lower end of climate change predictions, the United Nations estimates that improving existing infrastructure to make it resilient to more extreme weather could cost an extra \$150 billion per year by 2025, and the costs rise dramatically if temperatures increase past the 2°C trajectory. And even this investment in adaptation is dwarfed by the \$6.2 trillion annual investment that will be required for new low-carbon infrastructure.

Despite this urgent need, there is a massive investment shortfall yet to be met, with an annual infrastructure investment gap of more than \$1 trillion. Moreover, only 7-13% of current infrastructure projects are estimated to be low-carbon and designed to deal with the additional impacts of a changing climate.

New sources of capital with a longer term investment horizon will need to be sourced to close this gap. Global asset owners and managers — including pension funds and insurance companies — have both the necessary capital and a professed interest in lifting their exposure to climate-based investments. Institutional investors have \$ 93 trillion of assets under management in OECD member countries alone. And, at the UN Climate Summit in September 2014, investors with \$ 43 trillion of assets under management said they stood ready to invest in new climate-aligned assets.

However, for investors to increasingly allocate their capital to climate-friendly assets, these must offer competitive financial risk-adjusted returns to attract more investor capital. Green bonds offer one way to leverage increased capital towards tangible investment. They offer financially competitive investment opportunities where the environmental benefits are a bonus, not a sacrifice.

Bonds, especially to finance infrastructure, can offer long-term maturities. These are a good fit with institutional investors' long-term liabilities, and allow asset-liability matching. They can also provide much-needed diversification and more attractive yields, particularly in markets with a limited supply of bond instruments and a high concentration of investments in government securities. At the same time, bond returns are relatively stable and predictable when compared to equities, an important feature for some institutional investors, particularly pension funds seeking to hedge volatility risks. Labelled green bonds are the ones whose proceeds are used for green projects, most usually climate change mitigation and adaptation, and are labelled accordingly. If an entity can issue a bond, it can issue a green bond, as the "green" label depends upon the specific type of projects funded, not the environmental credentials of the issuer. So labelled green bonds can be issued by a wide range of entities, including larger well-known corporations with high credit ratings that account for a sizable share of institutional investor portfolios.

The green label makes it simple for institutional investors to identify green investments, being a discovery tool that can reduce friction in the investment process.

Labelled green bonds have been issued in emerging markets, including China, India, Brazil and Mexico, as well as in developed



Photo: © Geoff Henner/Robert Harding Library

Global asset owners and managers—including pension funds and insurance companies—have both the necessary capital and a professed interest in lifting their exposure to climate-based investments.

Only 7-13% of current infrastructure projects are estimated to be low-carbon and designed to deal with the additional impacts of a changing climate.

economies, and there is a strong appetite for them amongst investors. Current barriers to growth include education of market players; lack of bankable green projects and robust green project pipelines; lack of standards for what is green; risk-averse investors with limited capacity to analyse green investments; and lack of aggregation mechanisms for relatively small investments.

Whilst large global asset managers and owners as a group “stand ready” to commit but , the policy frameworks and market structures around green bonds are not yet robust enough to drive the hundreds of individual investment decisions required.

The Climate Bonds Initiative works to address the barriers to green bond market growth through a three-pronged approach: creating a credible, internationally recognized certification standard for what is green; educating market players by providing analysis of green bond market trends; and, significantly, bridging knowledge gaps for policy makers and regulators.

Green bond standards reduce transaction costs for both issuers and investors in ensuring the climate benefits of the green bonds are measurable, transparent, disclosed and in line with the latest climate science. The Climate Bonds Standards — covering both the green bond issuance process and what is green — are developed by scientists and technical experts. They are and overseen by a board of investors with \$34 trillion of assets under management. Developing standards is an essential element of rapidly scaling green bond markets. At the same time, it is essential to engage the public sector in addressing the current barriers in the market beyond the challenge of standards.

Its primary roles include ensuring that pipelines of green infrastructure projects are available for financing and taking an active stance in absorbing some investment risks in the initial stages of the market by providing credit enhancement.

The processes of general bond market and green bond market development can be mutually reinforcing. Policy makers can benefit from taking early account of the needs of green infrastructure when key regulations are put in place, helping to accommodate issuers and investors to facilitate green transactions.

The potential opportunity of the labelled green bond market has caught policy makers’ attention around the world. They are a tool for developed and emerging economies alike. On the one hand, they offer a fiscally efficient way of financing measures to meet climate change targets. On the other, they do not , without sacrificing general development, including improving infrastructure, public services and financial systems. In emerging economies in particular, labelled green bonds can be effective in attracting international investors to domestic investments. Their time has come. ▲

Environmental Champion Pamela Anderson

Photo: © Emma Dumitavey

Pamela Anderson uses her star power as an actress and model to advocate for animals, biodiversity and rainforests

It is early September at the Eastern Economic Forum in Vladivostok and Sergey Donskoy, Russia's Minister of Natural Resources and Environment, is talking earnestly about climate change with Pamela Anderson -- the former Baywatch star and now an active environmental campaigner, with a particular interest in the climate, animals, biodiversity and rainforests. She gave a passionate and authoritative speech at the Forum, warning that "our planet is in trouble" and calling for "a nation to lead and say

'enough is enough'". Decisions, she argued, "must be made based on ecological realities and not just economic realities."

She told *Our Planet*: "Governments need to make climate change a priority. It is the most important agenda." And she insists that: "The reality of climate change is no longer up for debate. It is real and it is happening now. Our changing climate is the most pressing challenge facing the world today."

“The reality of climate change is no longer up for debate. It is real and it is happening now.”



Photo: © Shutterstock

Pamela Anderson has been used to the limelight since her birth in Ladysmith, British Columbia, when she was Canada’s “*Centennial Baby*” being the first to be born on July 1, 1967—the 100th anniversary of the official founding of the nation. Her parents were young newlyweds: Barry, a furnace repairman, and Carol a waitress, who, she reports are still “madly in love”.

She was first spotted at a football game in Vancouver in 1989, and her way into modelling and the iconic role of C.J. Parker in *Baywatch* for five years from 1992. She

traces her environmentalism to her Finnish grandfather, who changed his name from Hyytiäinen to Anderson when settling in Canada and who—she has said—“talked to the trees, and of fairies”. Now a committed vegan, she became a vegetarian in her early teens after seeing her father cleaning an animal he had hunted.

She strongly believes that, as she said in her Vladivostok speech, “our modern media culture has given artists the platform to be influential commentators”, adding “this gives me the ability to be a voice on

many issues, like the diminishment of biodiversity, climate change, pollution, the treatment of animals, the destruction of our forests, and health issues associated with the decline in ecological integrity affecting this entire planet.”

Her first issue was animals: she told *Our Planet* that she had been an activist “for over 20 years”. And then, she went on, she “realized quickly the state of the planet, the rainforests and oceans—and that the need of environmental protection and awareness affects ALL lives”.

Rainforests are now a particular concern: “They are the lungs of the earth, but they are being mown down”, adding “deforestation is a major cause of climate change, putting more carbon dioxide into the atmosphere than all of the world’s forests combined.”

She is determined, as she told us, to “put my money where my mouth is”. Four years ago, she gave Vivienne Westwood, the designer and green campaigner, a unique seventieth birthday present—an acre of rainforest for every year of her life.

The 70-acre plot will be given to a rainforest community to look after by CoolEarth, a pioneering charity which—though working with such communities—has, she reports, “so far shielded five million acres of rainforest from the loggers”, while greatly increasing local incomes.

She is now to auction her engagement ring for the same cause. She has launched a line of vegan, cruelty-free footwear, made from recycled electronics. And she has just produced a documentary on climate change called “*This Changes Everything*”. Including, of course, impressions of Pamela Anderson.



CLIMATE:

The 360° Exhibition

12 OCT 2015 - 20 MAR 2016
Cité des Sciences

Blending scientific research and artistic creation, this Cité des Sciences exhibition presents a panoramic view of climate change. Photographer, Kadir Van Luhuizen traversed the world's seas and oceans in order to meet diverse people affected by the planet's rising sea levels.



WE HAVE THE POWER

We are the Change

04 NOV 2015 - 04 JAN 2016
Musée de l'Homme

For more than two years, the legendary Magnum photographers travelled the world to capture in images some of the most inspiring solutions to the climate challenge. These images show that we, the people, have the power to make the change. We have the power to build the sustainable future we want.



KITCHEN OF SOLUTIONS

Think.Eat.Save Campaign

04 - 11 DEC 2015
Grand Palais

An interactive exhibition created as part of the Think.Eat.Save campaign to raise awareness about the need to reduce food waste. The exhibition revisits the "kitchen" to showcase solutions developed and implemented by partners of the Think.Eat.Save network.