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Inclusive Green Economy

Building Bridges to a Sustainable Future

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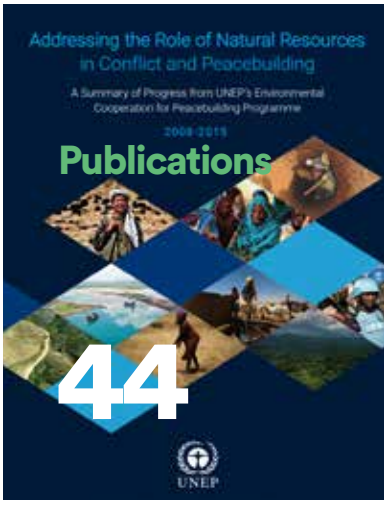
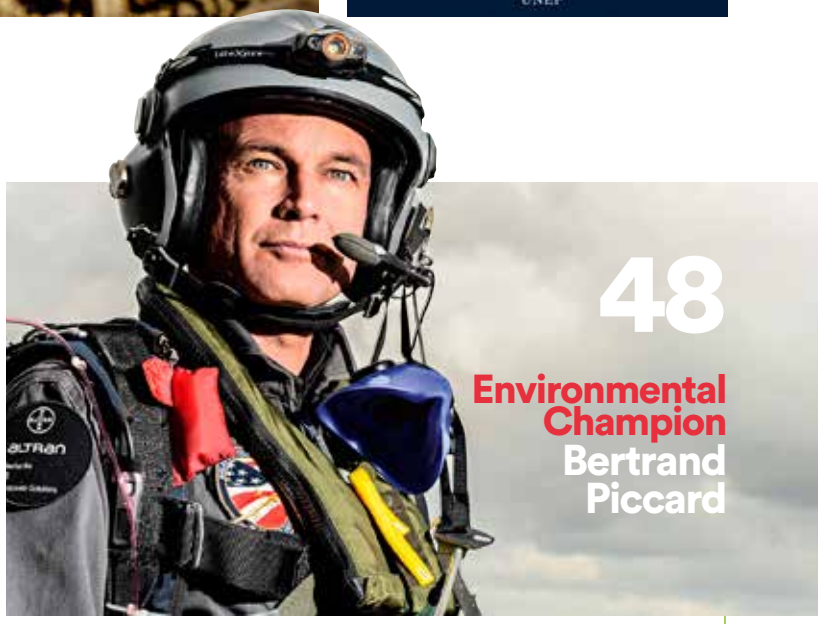
In this issue of Our Planet, policy-makers, distinguished stakeholders and environmental experts explore the many pathways towards an inclusive green economy





Achim Steiner
Reflections

Photo: © Noel West / Reuters

Achim Steiner

United Nations Under-Secretary-General and UNEP Executive Director

A decade ago, when I took up my appointment as Executive Director of UNEP, the economic, social and environmental landscape looked very different. The world was wedded to a paradigm of at-all-costs economic development. Social concerns – health, equality, justice – had little integration with economic concerns. Climate change and environmental degradation were gaining traction as global issues, but were more often than not treated as discrete challenges.

Ten years later, we have a global agreement on climate change. We have a universal approach to sustainable development. Importantly, we have an awareness and acceptance that solutions to these challenges must integrate the social, economic and environmental dimensions in tandem.

What this amounts to is an international recognition of the deep and fundamental relationship between social equity, economic development and a healthy environment. The shift in perspective since 2006 is extraordinary. It is critical for our future. And it is good reason for hope and optimism.

Central to this integrated approach is the notion of an inclusive green economy: an economy that both works for everyone and supports environmental sustainability.

Early on, this idea was seen as almost quixotic. It took a violent upheaval of our financial system

Photo: © Benoit Tessier / Reuters

The shift in perspective since 2006 is extraordinary. It is critical for our future. And it is good reason for hope and optimism.

in 2008 to open minds to the concept of a green economy.

In response to a financial cataclysm that saw markets lose a third of their value in only three months, UNEP tabled the idea of a "Global Green New Deal". This vision proposed a reorientation of fiscal stimulus packages toward renewable and energy-efficient infrastructure, creating job opportunities in sustainable industries in the process. Many countries drew on this recommendation as an integral part of their recovery efforts.

The idea has snowballed since then and gained purchase around the world. UNEP continues to support countries in advancing green economy policies and projects.

The Partnership for Action on Green Economy and related initiatives currently contribute to the shift of national economic structures in over 22 countries towards clean technologies, resource-efficient infrastructure, green skilled labour, good governance and well-functioning ecosystems.

The latter has been a crucial aspect of green economy work. Our ecological infrastructure provides enormous benefit to the economy beyond direct contribution through green industries. Early on, at the G8 meeting in 2007, the Economics of Ecosystems and Biodiversity (TEEB) initiative was born with the purpose of informing economic and social policy on the hidden values of ecosystems. More recently, the ProEcoServ project has demonstrated almost $1 billion worth of ecosystem services in just four localities across four countries.

This is evidence of a truth that many people instinctively know: Our economies do not function in isolation from our environment. But as this is true, so is the reality that our economies and our environment are deeply intertwined with our societies. Coupling sustainability with economic growth truly only matters to the extent that it supports an essential social quality: inclusion.

An "inclusive green economy", then, is an opportunity to advance both sustainability and social equity as functions of a stable and prosperous financial system. It is also a chance to look at the impact of individuals and society as consumers, and how our lifestyles draw from and imprint upon the environment.

And equally significant, this insight allows us to look at investment policies that drive and shape the societies and economies that we inhabit. The underlying markets and governing conventions for financial capital are a key element of this. Promisingly, many countries have developed policies and practices that capitalize on the role finance can play in shaping the world we want.

The UNEP Inquiry into the Design of a Sustainable Financial System has set out to study those innovations and best practices. The Bank of England, The Central Bangladesh Bank and the People's Bank of China, and other major financial institutions worldwide, have demonstrated that there is indeed a "quiet revolution" occurring in sustainable finance. The Inquiry's findings are gaining recognition in key financial constituencies around the world, and green finance is a matter now taken up by the G20 under the Chinese presidency. Building on our work of over two decades in sustainable finance, UNEP will act as secretariat to the G20 Green Finance Study Group, with the aim to inform further national and global action.

From a little-known idea with even less traction in financial circles, to the nucleus of sustainable development on the agenda of G20 meetings, the notion of an inclusive green economy has come some way in ten years. The goal now is to build on that awareness and action to shape our pathway to achieving the Global Goals and implementing the Paris Agreement.

In the early days of the past decade, milestones for an inclusive green economy were few and far between. Now they pass almost in a blur: $600 billion worth of pledges from institutional investors to decarbonize their portfolios; $10 billion invested in the Africa Renewable Energy Initiative. Markets for green technology, transport and infrastructure are expanding as never before. Environmental doom, while still a real risk, is changing into an economic opportunity from which planet and people benefit.

The journey toward a truly inclusive green economy continues, and many challenges remain. But the interest and potential of business and finance to support a sustainable and inclusive future has never been greater. Our task as individuals and societies is to continue to put sustainability and equity at the heart of our economic decision-making. ▲

Catherine McKenna
Creating Green Growth

The push towards a low-carbon sustainable economy will produce a new prosperity.

Catherine McKenna

Minister of Environment and Climate Change, Canada

I'd first like to pay tribute to Maurice Strong, an accomplished, industrious Canadian who passed away last November. He was the guiding force behind the 1972 Stockholm Conference, where the foundations of UNEP were created, and he was also UNEP's first Executive Director. Canada is proud of Maurice Strong's legacy and of the contribution he made to the founding of this great institution.

UNEP's mandate is more important than ever as we search for solutions to global environmental issues, and countries are demonstrating that we can work together to address the challenges that face us.

At the historic Paris climate conference, we reached a groundbreaking, ambitious and balanced climate change agreement. Canada worked hard alongside other countries to achieve this outcome. In Canada's National Statement in Paris, Prime Minister Justin Trudeau said that climate change is "not just a challenge, but a historic opportunity...to build a sustainable economy based on clean technology, on green infrastructure and on green jobs," and that "we will not sacrifice growth, we will create growth".

Economic growth and environmental responsibility are intertwined. World economies are shifting towards cleaner growth, and the global push toward a low-carbon, sustainable economy will produce new companies and new prosperity. The world economy stands ready to reward those who produce carbon-free energy that meets our collective worldwide needs for transportation and heating, and those who can help the world transition to a net-zero carbon economy.

Canada plans to be involved in this transformation by innovating at home and helping to implement lower-carbon alternatives around the world. Canada is already a leader in clean electricity, with the largest percentage of renewable electricity in the G7 and with 79 per cent of our electricity generated from non-emitting sources, but we are also well positioned to do more.

We will foster expertise in clean energy technologies, including energy efficiency, carbon capture and storage, renewable energy, fuel cells, transportation technology, energy storage and smart grids. Our clean tech sector is growing quickly and can help Canada's energy sector become stronger and more sustainable, and can help transition us to a low-carbon economy, creating opportunities for generations to come.

Within Canada's federal system of government, jurisdiction over energy resources and the environment is shared among the federal government, provinces and territories. We are collaborating with the provinces and territories on a pan-Canadian framework on climate change and clean growth, and developing a Canadian energy strategy that will protect Canada's energy security, encourage energy conservation, and bring cleaner renewable energy onto the electricity grid.

Our individual choices – like the cars we drive and how far we have to drive them, as well as the efficiency of our houses and the design of our urban landscape – affect Canada's emissions. So we will support our communities and economy by making new strategic investments in green infrastructure, clean technologies, transit and innovation.

Photo: © Todd Korol / Reuters

Canada recently pledged $2.65 billion to support developing countries' transition to low-carbon economies that are greener and more climate resilient.

Canada is already a leader in clean electricity, with the largest percentage of renewable electricity in the G7 and with **79 per cent** *of our electricity generated from non-emitting sources.*

In fact, the Government of Canada has committed to creating a $2 billion Low Carbon Economy Trust to fund projects that reduce emissions and contribute to transforming our economy.

The low-carbon innovations we make can be commercialized, scaled up and exported. Done right, this will create good middle class jobs, grow our economy and reduce pollution. Businesses need to be part of the solution.

Canada has notable experience working collaboratively with multilateral organizations to support clean energy deployment, particularly through Canadian facilities established at multilateral development banks that aim to catalyze investments in renewable, low-carbon technologies in developing countries. For example, we are working with the international community through innovative partnerships and investments to deploy clean energy technology to developing countries.

Canada recently pledged $2.65 billion to support developing countries' transition to low-carbon economies that are greener and more climate resilient. This included a contribution of $150 million to support renewable energy in Africa through the Africa Renewable Energy Initiative, which will feed into the goal, supported by G7 Leaders, of unlocking 10 Gigawatts (GW) of new renewable energy in Africa by 2020, and 300 GW by 2030.

During COP21, Canada also announced its participation in Mission Innovation, a global partnership of 20 countries aimed at doubling government investment in clean energy innovation over five years, while encouraging private sector leadership in clean energy. The initiative also seeks to better coordinate and report on clean energy efforts.

Respecting our obligation to help protect our planet does not mean sacrificing economic growth. To the contrary, Canada has the potential to prosper in clean energy, technology and other growing industries that are less impactful than many staples of the high-carbon economy.

Beyond that, Canada has the tools to demonstrate throughout the world how a resource-based economy can be developed responsibly, and with the low-carbon future in mind. ▲

Pablo Badenier Martinez

Time for Boldness

A global carbon price is needed to help control emissions, promote sustainable development and build green economies.

Pablo Badenier Martinez

Minister of the Environment, Chile

The evidence is irrefutable: the climate is changing, generating a range of environmental, social and economic problems. Without a doubt, climate change is the greatest challenge humanity has ever faced. The broad consensus is that the cause is human activity, and specifically how we fuel our economies. We have become, ironically, our own worst enemies. Put simply, our current consumption and production patterns are unsustainable, and the consequences will be felt by our children and grandchildren. Urgent action is needed.

Climate change could not be more complex, and undoubtedly involves multiple issues. Chile is an example of this: we are socially, economically and environmentally vulnerable to its effects. Moreover, we are acutely aware that climate change is a factor in deepening inequities at the local, national and international levels. For this reason, it is our obligation to address this problem before its consequences are irreversible.

Chile is not a significant contributor to global emissions of greenhouse gases (GHG): we account for little more than 0.26 per cent of the global total. However, we recognize our role as a global citizen, and our responsibility not only with more vulnerable communities but with future generations. It is time to acknowledge that only together will we be able to face the greatest environmental, economic and social threat that humanity has faced in its history. It is time to be bold.

At last we observed some audacity in the COP in Paris in 2015. The commitment for climate action was global: 195 countries supported the Paris Agreement. By December, more than 180 countries representing 97 per cent of global emissions had submitted their Intended Nationally Determined Contributions (INDCs). Chile´s INDC is adequate, consistent, evidence-based and built through a participatory process. On mitigation, we propose to further reduce the carbon intensity of our economy by 2030. In addition we propose targeted action in the forestry sector.

However, while nation-states must submit and implement their own contributions, we are confident that more active climate action is possible with the right global instruments. For this reason, Chile is actively participating in the Carbon Pricing Leadership Coalition. This brings together leaders from across government, the private sector and civil society committed to advance the carbon pricing agenda by working with each other towards the

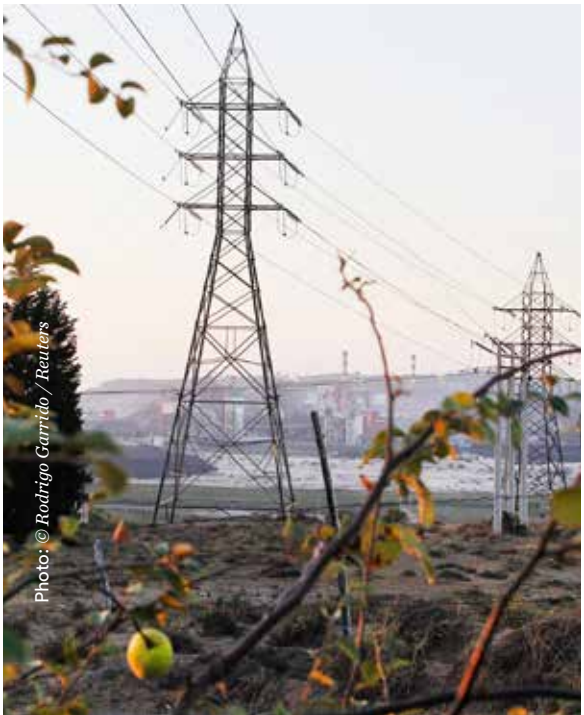


Photo: © Rodrigo Garrido / Reuters

Sending price signals…is an essential step to fully internalizing the external costs of global warming.

Photo: © STRINGER Chile / Reuters

By December, more than **180 countries** *representing* **97 per cent of global emissions** *had submitted their Intended Nationally Determined Contributions (INDCs).*

long-term objective of a carbon price applied throughout the global economy.

While we do not believe that market instruments are the only way forward, we are convinced that sending price signals to public and private agents is an essential step to fully internalizing the external costs of global warming. Carbon pricing remains controversial, but it can be an efficient and effective mechanism for controlling emissions and recognizing the differentiated impacts of national contributions to them.

Global problems require global solutions and a worldwide price for carbon may be the step that generates both the appropriate market signal for emissions reduction and the necessary funds to support technological change in the energy sector and climate change adaptation in less developed countries. We therefore call for the implementation of a global carbon price as part of the international agenda to face climate change.

Chile has advanced in this area. In 2014, Chile adopted the first CO_2 tax in South America. This stands at US$5 per ton of CO_2 emissions, for turbines and boilers, and therefore essentially affects the electricity generation sector. The tax will be implemented in 2017, thus making Chile a pioneer in the use of economic instruments in environmental policy – and specifically climate change mitigation – in Latin America.

Environmental taxes are recognized as a central tool in environmental management, and serve to deliver appropriate market signals and modify harmful behaviour. Implementing green taxes is a major step in environmental policy in our country, since it will allow productive agents to internalize the negative externalities of their processes, improve environmental conditions, and reduce greenhouse gas emissions.

We invite all countries to make similar gestures. In the medium term we envisage implementing global mechanisms that recognize the externalities associated with greenhouse gas emissions. We are convinced that this is the road forward.

We face the greatest challenge of collective action that mankind has known and our generation has the unique opportunity to find the solution. The implications of climate change go far beyond environmental issues; they are also political, economic and social. Chile has taken the challenge and is actively implementing a range of initiatives to respond to its commitments. We know that we cannot do this alone; we need the participation and collaboration of the private sector and the international community.

We are optimistic that a global effort, building on the commitments in Paris, but going further will allow us to advance towards a more equitable society and a more sustainable planet. ▲

Edgar Gutierrez-Espeleta

Towards Low-emission Development

Consultation, dialogue and wide participation are essential to building an inclusive green economy.

Edgar Gutierrez-Espeleta

Minister of Environment, Energy and Sea, Costa Rica

Historically, Costa Rica has been proactive in climate change negotiations. It announced in 2007 its goal of achieving carbon neutrality by 2021. And in September last year, in its Intended Nationally Determined Contribution (INDC), the country proposed ambitious emissions reductions and climate action through the year 2050, setting the country on a path towards an effective de-carbonization of its economy.

Achieving such a transition to low-emissions development will require Costa Rica to develop new policy instruments and legal frameworks. Some of these instruments are already in place: Costa Rica's VII National Energy Plan, for instance, places emphasis on achieving greater energy efficiency, and will be instrumental in helping the country move towards low-emissions development, by helping channel public and private investment into more efficient public and private transport. While greater energy efficiency in homes will lead to a contraction in demand for electricity over the long term, the increase in the consumption of electricity in transport will offset this. Hybrid or electric buses and a planned interurban electric train will help improve the quality of public transport while reducing greenhouse gas emissions and fossil fuel imports, which cost the country 4 per cent of its GDP in 2014.

Reaching carbon neutrality also means going beyond offsetting emissions through payment for results and environmental services to a progressive policy of emissions reductions to help put the biggest-emitting sectors onto a steady path towards de-carbonization. Since the 1990s innovative fiscal policies and market instruments have generated cross-subsidies between energy and forestry. A consumption tax on fossil fuels produced revenues for the management of forested lands through environmental service payments. This successful programme has increased forest cover to over 52 per cent of the country's national territory.

The National Programme for Carbon Neutrality has been able, since its inception in 2010, to certify over 50 businesses as carbon neutral. The programme has generated keen interest from the private sector and continues to attract businesses that seek to reduce or offset their carbon footprint. It is complemented by several National Appropriate Mitigation Actions in such productive sectors as coffee and livestock, and there are plans to incorporate others like urban transport and waste management. Many innovative initiatives are taking place, particularly in agriculture and industry, to explore ways to convert farm residues and waste into sources of renewable energy, and replace fossil fuels with biomass-fueled boilers and biofuels. The proposed INDC will build on these early actions and develop new fiscal policies and instruments that will help the current programmes of payments for results evolve into a more sophisticated financial architecture to support low-emission development initiatives in the coming decades.

But perhaps the most original aspect of Costa Rica's INDC was the fact that it was formulated through a complex process of consultation, dialogue and proposal development. The Ministry of Environment, Energy and Sea (MINAE, to use its Spanish acronym) organized six thematic and sectoral workshops with wide participation from the energy, forestry,

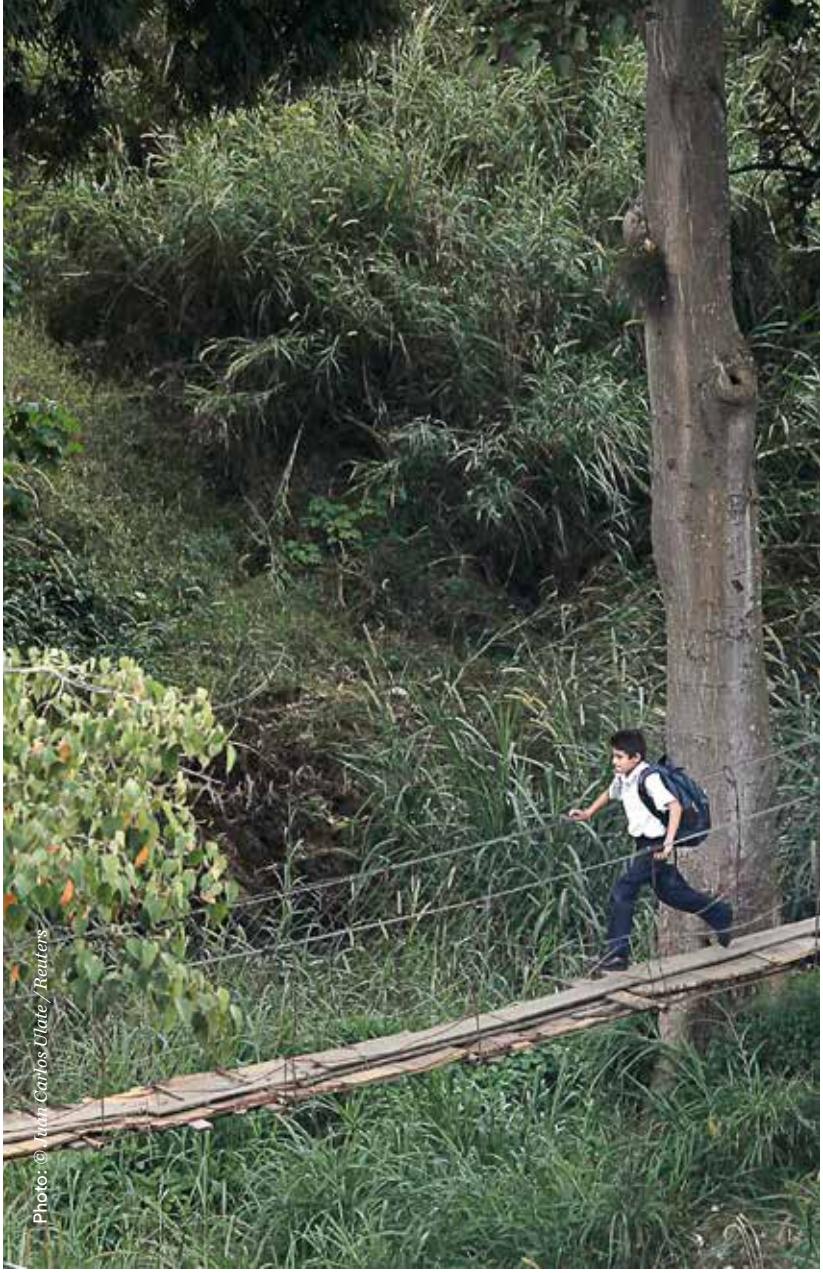


Photo: © Juan Carlos Ulate / Reuters

Using a per capita emissions measure ... puts the responsibility for climate action with all Costa Ricans and not just the state or private enterprises.

The National Programme for Carbon Neutrality has been able, since its inception in 2010, to certify over **50 businesses** *as carbon neutral.*

agriculture, transport, and solid waste sectors. The workshops, which brought together over 450 participants, enabled the capturing of ideas and technical criteria from both public and private sectors to define the long-term emissions reduction goals. After an internal discussion in MINAE, a draft of this National Contribution went before an international panel of peer reviewers from international organizations and NGOs specializing in climate change issues. Costa Rica was one of very few countries to submit its INDC for such a review prior to its formal presentation.

Costa Rica focused its commitment on "climate action" to increase society's resilience to the impact of climate change and strengthen the country's capacity for long-term, low-emissions development that mitigates greenhouse gases in line with what science dictates. Climate action will support adaptation efforts to ensure that communities, especially the most vulnerable, are resilient to the inevitable impacts of global warming. Costa Rica is accepting the challenge to reduce emissions at source rather than compensate for them by increasing forest cover. This mainly means accepting the challenge of the increase in emissions from transport and providing clean solutions such as public transport and alternative mobility.

Climate action also requires different institutional developments for transparency and accountability. Climate data, statistics and reports must be openly available to social and economic players, leaving room for innovation in information technology products. Other institutional developments that have been proposed aim to strengthen INDC interagency coordination by establishing a Citizens Advisory Council and specific monitoring efforts among key agencies. This approach seeks to overcome breakdowns in public policy as a result of electoral cycles by enabling the country to agree long-term goals.

Our approach to defining the INDC provides a vivid example of how a country can recognize and manage the limits of quantitative-deductive approaches to formulating climate policy and take a more qualitative approach through developing and assessing socio-economic scenarios. Costa Rica's INDC also sets an absolute maximum of emissions for 2030, which we consider better practice than using baselines or business-as-usual scenarios, which are intrinsically variable.

Another original methodology was to take emissions per capita as the basic metric, establishing targets of net emissions per capita of two tons of CO_2 equivalent by 2030 and one ton by 2050. This ambitious universal goal is significant for its symbolic value, as it links each citizen to the country's targets. As I indicated during COP 21, decarbonizing the economy necessarily involves collective decisions, but mainly arises from individual ones on modifying and adjusting consumption patterns to meet the new demands of the international community. This approach also allows a clear and transparent convergence of the climate change and sustainable development agendas.

Using a per capita emissions measure, as I proposed to the UNFCCC, puts the responsibility for climate action with all Costa Ricans and not just the state or private enterprises (which already have a carbon-neutrality programme). The task is to define how that responsibility is exercised. What tools should be developed to allow citizens to know precisely their climate footprint? Can they also have adequate reduction and compensation mechanisms? The same applies to public institutions and private organizations.

The design and preparation of Costa Rica's INDC denotes how it became an instrument of national development policy in the transition towards a low-emission economy, rather than an instrument of environmental diplomacy or an agenda for international cooperation. ▲

UNEP at Work

Promoting South-South cooperation

By sharing their experiences, emerging economies are having a big impact on global sustainable development.

Photo: © Courtesy

Although industrial economies remain at the heart of the world's sustainability challenges, emerging economies are playing an increasingly prominent role in influencing global sustainable development.

South-South cooperation has emerged as one of the key tools for countries to overcome shared challenges in making their economies greener and more inclusive. Since 2013, UNEP has been helping to facilitate South-South cooperation on inclusive green economy and supporting governments and policy makers to learn about the multiple pathways to sustainable development that countries are pursuing around the world.

Photo: © Courtesy

One of UNEP's recent projects, *Enhancing South-South Cooperation – Building the Capacity of Developing Countries to Promote Green Economies,* showcased four national-level sustainable development initiatives that are related to Green Economy: China's Ecological Civilization, Bolivia's Vivir Bien (Living Well), Thailand's Sufficiency Economy, and South Africa's Green Economy transition.

Photo: © Courtesy

South-South cooperation has emerged as one of the key tools for countries to overcome shared challenges in making their economies greener and more inclusive.

These four approaches were shared at the 2013 Global South-South Development Expo as well as at a series of knowledge exchange and capacity building events in Indonesia, Republic of Korea, and Switzerland. The project also produced a report, *Multiple Pathways to Sustainable Development: Initial Findings from the Global South*, and five accompanying videos. A follow-up report will be launched at UNEA-2 in Nairobi in May 2016.

UNEP also has two projects that are focused on South-South cooperation between China, Mongolia and five Central Asian countries. The first, entitled *South-South Cooperation in Mongolia and Central Asia Countries: Sharing Knowledge on Inclusive Green Economies and Ecological Civilization*, runs from 2014 to 2016, and aims to support Mongolia and Central Asian countries in developing their research capacity in the areas of green economy and ecological civilization. The initiative has three main components: a fellowship programme, a high-level policy roundtable and a scoping report on green economy in Central Asia that is expected to be launched in 2016.


Photo: © David Mercado / Reuters

A related project, *South-South Cooperation in China and Central Asia: Investing in a Green Silk Road*, will link issues identified in the scoping report to priority SDGs that will be determined by the governments of the five Central Asian countries.

This project will involve quantitative analysis of the sector-specific green economy investments required to meet the priority SDGs. It will also provide national research institutes with training opportunities on the analytical methodologies used in the project.

Partha Dasgupta
Beyond GDP

Economic growth should be defined as growth in inclusive wealth.

Partha Dasgupta

Frank Ramsey Professor Emeritus of Economics, University of Cambridge, and visiting professor, New College of the Humanities

In September last year the United Nations General Assembly adopted a set of Sustainable Development Goals (SDGs) to be met by the year 2030. These range from poverty eradication and improvements in education and health to the protection of global assets, including the oceans and a stable climate. However, neither the SDGs nor their background documents explain how governments should judge the sustainability of the development programmes they undertake to meet the goals. It is currently taken as a given that the only way the SDGs can be met is for the world economy to enjoy healthy rates of economic growth. Unfortunately it is universal practice to interpret economic growth as growth in gross domestic product (GDP).

GDP is the market value of the final goods and services that an economy produces in a year. It measures the flow of economic activity over the year. Because GDP does not allow for the depreciation of capital assets (for example, the deterioration and destruction of nature), GDP can increase even as the economy's productive capacity declines. The correct measure of productive capacity is the social worth of an economy's entire stock of capital assets, including not only manufactured capital (roads, buildings and machines) and human capital (health, education), but also natural capital (the atmosphere, the oceans, terrestrial ecosystems and sub-soil resources). This is a much more inclusive notion of wealth.

In contrast to GDP, the inclusive measure of wealth is a stock. By economic growth we should now mean growth in inclusive wealth. Assessing whether the SDGs are sustainable will require governments to check that the development programmes they undertake to meet them raise their economies' inclusive wealth. As of now no one knows whether the SDGs can be met on a sustainable basis.

Photo: © Arko Datta, Reuters

Photo: © Rupak De Chowdhuri / Reuters

Average income in the UK in 1990 was about **25 per cent less** *than in 2005.*

There are ample grounds for thinking that the world economy's inclusive wealth has declined in recent decades. Data on capital stocks are sparse (unlike private firms, nations don't produce balance sheets), but rough estimates suggest that the rate at which humanity is using nature's services exceeds the rate at which nature is able to regenerate itself by a multiple of 1.5. That means if the current rate of our use of nature's services were to be sustainable, we would need 1.5 Earths.

It will prove hard to break the long-standing habit of viewing economic success in terms of GDP growth. One reason is that we do not know how to de-couple GDP from recorded employment. If economic losses occurred gradually and were shared in a manner deemed fair by the general public, there would be nothing catastrophic for people in a country where the average income is $35,000 a year to suffer an income loss of even 25 per cent, let alone 5 per cent. Average income in the UK in 1990 was about 25 per cent less than in 2005.

It is difficult to maintain that UK citizens enjoyed significantly lower levels of personal well-being in 1990 than they did in 2005. Findings in hedonic psychology based on large-scale questionnaires suggest that a general rise in private consumption among a population already enjoying a high standard of living adds little to happiness.

We are encouraged to think that to consume material objects is to contribute to the social good.

In contrast, employment is known to be a powerful factor in a person's sense of well-being and self-worth. It would be a catastrophe if a 25 per cent drop in average income in a rich country were accompanied by a comparable drop in employment. Citizens would justifiably demand that any significant drop in GDP be shared by all. But that would require employment not to decline. Governments in modern economies have either been unable to or have chosen not to prevent inequities from appearing in employment and income, especially in hard times. The one route they have taken to achieve full employment is the design of policies that are thought to boost the demand for goods and services.

All decision makers, be they Keynesians or otherwise, share the view that aggregate demand needs to keep rising if employment levels are to be sustained. Politicians and media commentators express anxiety when spending on the High Street shows signs of decline. We are encouraged to think that to consume material objects is to contribute to the social good. And we are not encouraged to ask whether the composition of output could be so altered (for example, toward improvements in the quality of public spaces) as to weaken the link between employment and GDP. It is more than an irony that short-run macroeconomic reasoning is wholly at odds with the now-universal desire for sustainable economic development. ▲

Park Won Soon
Small Actions = Big Changes

A new urbanization will tackle climate change, increase energy self-reliance and coexist with nature.

Park Won Soon

Mayor of Seoul and President of ICLEI – Local Governments for Sustainability

Climate change and air pollution are not problems for just one country, one city or one town. The melting of the Arctic threatens the survival of polar bears, and the city of Seoul shares responsibility for this. This is a challenge and pending problem for every single person to resolve; it will become a theme for everyone.

New planning for urbanization is a first critical step in addressing climate change. Many cities already have a long history and are moving toward stability, but many others are just starting urbanization, experiencing rapid development and expansion. We need to move away from standardized urbanization and planning that aims for modernization and industrialization through destruction and construction, building concrete roads and buildings. We should plan instead for a "new urbanization".

"New urbanization" addresses climate change.
"New urbanization" has the foundation for energy self-reliance.
"New urbanization" is sustainable where humankind and nature co-exist.

Seoul is on the road to such a "new urbanization". By restructuring and regenerating our city, we are dreaming of a sustainable future city where humankind and nature coexist, and which tackles climate change while establishing the foundation for energy self-reliance. Together with our 10 million citizens, we are paving the way for a "new Seoul".

Korea, which went through the tragedy of the Korean War, used to be one of the poorest countries in the world, but has now grown to become one of its ten major economies. Its GDP has multiplied by more than 300-fold since the 1950s, and Seoul was at the centre of this miracle. In the process it became a global megacity, visited and loved by people around the world. More than 12 million tourists come every year.

However, behind this rapid, compressed growth, Seoul suffered from environmental pollution, an energy crisis and reckless urban development. Our sky was covered with dust and smog. Streams were rotten and our forests were dying. The city thought for a long time about how to resolve this. We dreamed of a new Seoul that could overcome climate change and energy challenges and achieve eco-friendly city regeneration. And we took action.

We have implemented such low-pollution vehicle projects as switching public transport to natural resources, including compressed natural gas, installing emission-reduction devices on outdated diesel vehicles, and converting engines to cut emissions. We have increased the supply of electric and hydrogen fuel cell vehicles and expanded the charging infrastructure. And we have designated pedestrian-only streets to reduce the number of vehicles, the main culprit for greenhouse gas emissions and air pollution.

Concentrations of particulate matter ten micrometers or less in diameter (PM_{10}) fell from 71μg/m³ in 2001 to 46μg/m³ in 2014. This, however, is still relatively high compared to

Photo: © Kim Hong-Ji / Reuters

Just as a small stone thrown into a lake makes big waves, small actions from citizens changed Seoul.

The rate of energy self-reliance rose from **2.8 per cent** *in 2011, to* **4.7 per cent** *in 2014. Energy saving also created around* **20,000 new jobs**.

other major cities around the world. We realized our citizens alone cannot improve air quality, and that a joint cooperation and implementation system is needed among local governments and cities around the world.

The Seoul Metropolitan Government also decided that the fundamental way to tackle climate change is to reduce energy use, and the 2011 Fukushima nuclear disaster gave us confidence in that decision.

Photo: © Kim Hong-Ji / Reuters

We initiated a "One Less Nuclear Power Plant" project, establishing goals and taking action to match what would be generated by a nuclear power plant by saving energy and producing renewable energy, such as solar power.

Citizens installed solar power panels at homes and schools, and joined in building solar power plants. More than one sixth of Seoul's population – around 1.7 million citizens – joined the Eco-Mileage System, a programme that provides incentives based on the amount of energy saved. Energy saving became a part of life at home, school and at work.

Wastewater heat from sewage treatment works, chimney waste heat from resource recovery facilities and small hydropower became usable energy sources, and we have also improved the energy efficiency of buildings, which account for 56 per cent of energy consumption.

In June 2014, six months earlier than the original schedule, Seoul reached the goal of cutting two million tons of oil equivalent (TOE) thanks to citizens' active participation. The rate of energy self-reliance rose from 2.8 per cent in 2011, to 4.7 per cent in 2014. Energy saving also created around 20,000 new jobs.

"One Less Nuclear Power Plant" is attracting both Korean local governments and international organizations and cities to come and learn from it. Meanwhile, Seoul is implementing the second phase of the programme, which – if successfully completed – will increase its energy self-reliance by 20 per cent and cut 4 million TOE of energy by 2020, avoiding the emission of 10 million tons of greenhouse gases.

So Seoul is changing, addressing climate change, living with the environment, and we are on our way to a sustainable

Photo: © Kim Hong-Ji / Reuters

At the World Congress, **10 million Seoul citizens** *made a promise before the city delegates from around the world to cut* **10 million tons** *of greenhouse gas (GHG) emissions by 2020 through reducing emissions by one ton per person.*

future city. Our vision of a green city taking the road to "new urbanization" enables us to achieve growth at the same time. All this became possible by working with our 10 million citizens, through citizen power and citizen governance. Whenever visiting city officials ask me how our city was able to change, I say, "Citizens are the answer" and "Citizens are

Photo: © Stringer Korea / Reuters

the energy". Just as a small stone thrown into a lake makes big waves, small actions from citizens changed Seoul.

Now, we are dreaming of change not just for our city, but for the world. We are dreaming of city governance that reaches beyond citizen governance. Cities around the world are acting with us.

In April 2015, I was elected President of ICLEI, the world's largest organization for cities and local governments, with around 1,000 cities from 86 countries working towards sustainable development. More than 1,300 city delegates from 213 cities and local governments from 91 countries attended its World Congress last year to discuss how to tackle climate change. I joined 35 other mayors from leading megacities, cities and towns to commit to the Compact of Mayors, the first global announcement of its kind.

At the World Congress, 10 million Seoul citizens made a promise before the city delegates from around the world to cut 10 million tons of greenhouse gas (GHG) emissions by 2020 through reducing emissions by one ton per person.

I believe that the cooperation and actions of ICLEI cities contributed to the climate agreement that was adopted in Paris in December. Cities around the world need to have a new dream together. We need to open a new era for communication and cooperation, moving towards sustainable future cities. We need to reach beyond the national borders; citizens and cities from different countries need to hold hands.

By restructuring and regenerating our city, we are dreaming of a sustainable future city where humankind and nature co-exist.

The world is emphasizing collaboration and cooperation that reach beyond nations, societies and markets. Stakeholders, including individuals, are creating a new flow of change. I am confident that our small actions will lead to big changes, writing a new history of the Earth. If we go together, we create a road. If we dream together, it turns into a reality. Let's go and dream together for our one and only Earth. ▲

Tracking progress

New metrics and measurements of economic performance and sustainability

Open access to data and knowledge is fundamental to the transition to a vibrant and inclusive green economy. Such access enables all stakeholders to better understand and participate in the collection, use and analysis of data. That's why UNEP has developed UNEP Live (uneplive.unep.org), a web-based knowledge management platform, that gives users access to substantiated, contextualized data about sustainable consumption and production patterns and economic performance. Such information, which looks beyond growth in income and GDP to include human well-being, can be a powerful tool for policy-makers.

Two specific data flows can help countries track progress toward an inclusive green economy: i) the Resource Efficient Indicators and ii) the Inclusive Wealth Index. These measures also track progress toward Sustainable Development Goals 8 (decent work and economic growth), 12 (responsible consumption and production) and 17 (means of implementation). In addition, UNEP is finalizing a framework to measure Green Economy Progress (GEP); this tool tracks countries' progress towards achieving an inclusive green economy transition. It is also closely linked to the 2030 Agenda, as the GEP measurement framework relates directly to eight out of the 17 SDGs.

Resource Efficient Indicators

Material flows and resource productivity indicators are important for monitoring changes in the patterns and rates of resource use as economies grow. As interest in building green economies expands, this data will help governments, policy researchers and other stakeholders (i) develop a better understanding of how economic growth patterns influence resource use; (ii) evaluate the impacts of policies that have been adopted in the past; and (iii) minimize resource use through targeted sustainable consumption and production policies and actions.

Indicators for measuring the success of sustainable resource management are based on material flow accounting principles. Such information can help track progress toward SDG 8, target 8.4: "Improve global resource efficiency in consumption and production", and SDG 12, target 12.2: "Achieve the sustainable management and efficient use of natural resources".

See more at: ***http://bit.ly/1oEwvoq/***

Photo: © *Benoit Tessier / Reuters*

Inclusive Wealth Index

The inclusive wealth index measures the wealth of nations in relation to a country's productive base. It accounts for all of the assets from which human well-being is derived – including manufactured, human and natural capital – and shows the percentage changes over time. The inclusive wealth index measures traditional stocks of wealth as well as less tangible factors such as education levels, health care, environmental assets and the functioning of key ecosystem services. The index contributes to SDG Goal 17, target 17.19: "Develop measurements of progress on sustainable development that complement gross domestic product".

See more at: ***http://bit.ly/1oEx4yo/***

The Green Economy Progress measurement framework

UNEP is designing a Green Economy Progress (GEP) measurement framework to measure progress towards achieving the transition to an inclusive green economy at the national and global levels. The framework is meant to support a transition to an economy that produces environmentally friendly goods and services and that creates economic opportunities, social improvements and new jobs while staying within planetary boundaries.

The GEP measurement framework includes a composite index, the Green Economy Progress (GEP) index as well as a "dashboard" of indicators. This project is an initiative under the Partnership for Action on Green Economy (PAGE), which brings together five UN organizations (UNEP, UNIDO, UNITAR, ILO and UNDP).

The GEP index captures particular characteristics of the green economy by including multidimensional indicators, such as measures that capture the link between health and the environment. It focuses on countries' progress with respect to their own targets, and it also tracks the sustainability of that progress. In other words, this ensures that progress in improving current human well-being does not come at the expense of future well-being.

Two workshops were organized in 2015 to present the conceptual framework and a first prototype of the GEP measurement framework. Participants included academics, PAGE partners, the Green Growth Knowledge Platform, the OECD and NGOs.

A draft report that summarizes the first results of the framework was made available in October 2015. A final publication will be available in early 2016.

See more at: *http://bit.ly/21nao3B/*

Libby Schaaf
Leading the Way

A US city is already achieving economic growth, greater equity and reduced emissions by implementing the inclusive green economy.

Libby Schaaf

Mayor of Oakland, California, USA

People across the globe celebrated the signing of the United Nations climate accord in Paris in December. It was truly a landmark event and I was proud to be a part of the Local Climate Leaders Circle of Mayors representing my city and others across the United States.

It was inspiring to see 196 countries come together to sign an agreement to protect the future of our planet. But while national governments were just starting to make their commitments to a cleaner and greener future, cities were showcasing years of success and demonstrating how to get there. Delegates saw the vision, leadership, and innovation of the more than 500 mayors who described the incredible progress their communities have made in winning the battle against climate change.

Sceptics say that we can't afford to decarbonize our economies. I say that we can't afford not to. Oakland, California – home to more than 400,000 of the most diverse and creative people in the world – provides a shining example of how to build an economy that thrives on the opportunities presented by addressing climate change.

Here on the West Coast of North America, clean-economy jobs grew 19 percent between 2010 and 2014, more than double the rate of overall job creation. This is very visible in Oakland, where industries such as solar energy, recycling, energy efficiency and clean technology are booming. The city hosts more than 350 companies that are focused on clean and green industries, and those companies have more than 7,000 employees. Our unemployment rate has plummeted from 17.1 per cent in 2010 to just 5.5 per cent in 2016, and while our economy has grown, our carbon footprint has shrunk. Between 2005 and 2013, Oakland reduced its emissions by more than 15 per cent overall, and a host of new programmes launched since 2013 will lower them even further. Our per capita emissions are among the lowest in the United States, and the city is committed, through its Energy and Climate Action Plan, to continue reducing emissions by more than 80 per cent by 2050.

In a recent article, the governors of California, Oregon, and Washington joined the Premier of British Columbia to argue that "halting climate change is an opportunity to deepen investments in what already makes our communities great, such as clean air, resilient infrastructure, efficient transportation, and good jobs." To this list, I would add: the opportunity to ensure that every member of the community can be part of the green revolution.

Oakland is one of the most diverse cities in the world, and this diversity defines not only who we are, but what we stand for. To be a sustainable model city, new jobs and investments must reflect the diversity of our population. Our low-carbon

Photo: © Reuters

Photo: © © Robert Galbraith / Reuters

Between 2005 and 2013, Oakland reduced its emissions by more than **15 per cent overall**, *and a host of new programmes launched since 2013 will lower them even further.*

economic growth is doing just that. Our green economy includes CEOs, designers, engineers, and analysts. It also includes solar panel installers, energy efficiency contractors, recycling workers, and urban farmers. Oakland non-profits like GRID Alternatives, Solar Oversight, and Vote Solar create pathways for traditionally underrepresented residents to reap the benefits of solar and energy efficiency improvements. Our solar companies like Sungevity, BrightSource, and Borrego Solar are creating a wide array of living-wage, green-collar jobs in markets with long-term employment potential.

Non-profit organizations like Oakland's OTX West are diverting e-waste by teaching young people to rehabilitate old computers so they can be put back into use by schools, community centres and low-income families who otherwise would not have access to internet-connected computers. Using funds from California's Cap and Trade system, the

Sceptics say that we can't afford to decarbonize our economies. I say that we can't afford not to.

City of Oakland is turning the profits of polluters into clean, safe, walkable, efficient and affordable housing for our residents. Throughout the green economy, both the jobs and the benefits of this growth are being felt by all sectors of the population, adding to the vibrancy and resilience of the city.

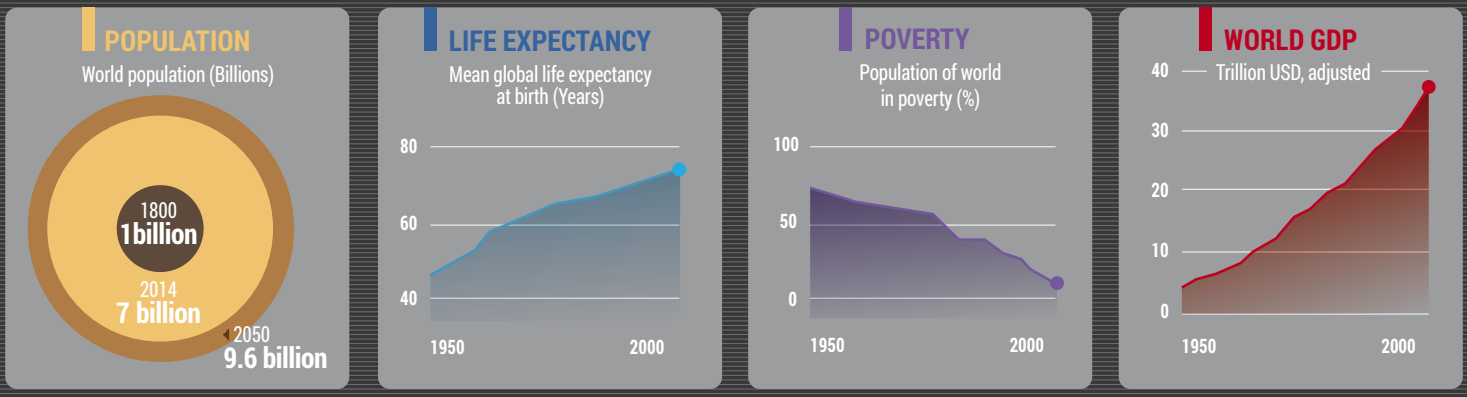
This is just the beginning. As Daniel Hamilton, the City's Sustainability Manager, puts it: "the opportunities created by the transition to a carbon-free world will be widespread, and nowhere is better suited to take advantage of the new business models than Oakland." Our economy of the future will house green jobs not only in sectors like solar energy and waste reduction, but across all business types. Our automotive sector will continue along its pathway to electric cars and non-traditional modes like electric scooters and bicycles, just launched in Oakland by the clean tech company GenZe by Mahindra.

Technology companies will find new and innovative ways to reduce emissions in everything from computers and appliances to office buildings and hospitals. Small companies will supply the world with local solutions to environmental challenges, demonstrating that saving the planet is good for business. From restaurants and corner stores to multinational corporations and technology giants, the inclusive green economy holds the promise and potential to blend equitable growth and environmental performance with economic prosperity. It is bold, it is collaborative, and it is the most dynamic path to equitably meet the challenges of climate change – as we are demonstrating in Oakland. ▲

Inclusive Green Economy

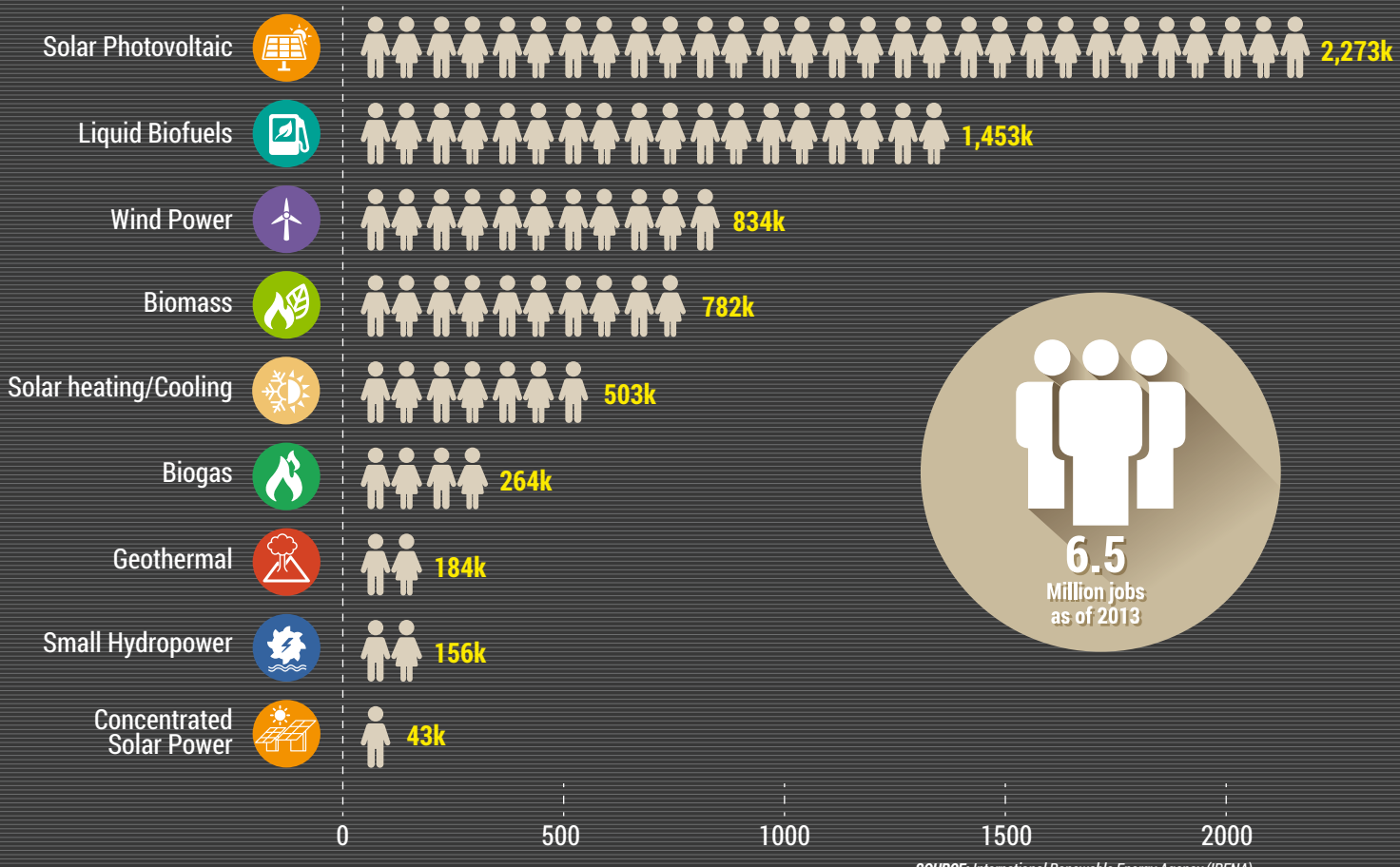
Selected Global Indicators

Economic growth has improved millions of lives globally



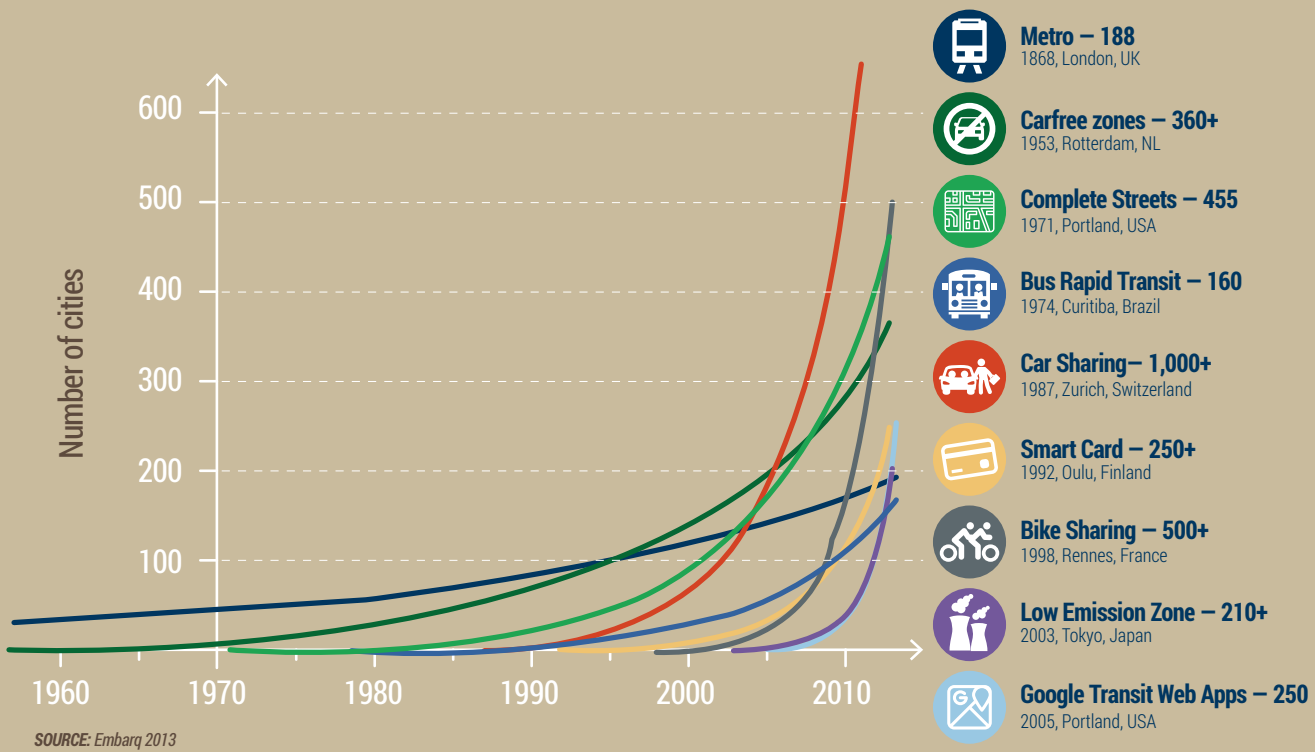
SOURCE: www.thelancet.com/infographics/planetary-health

Renewable energy jobs by technology 2013



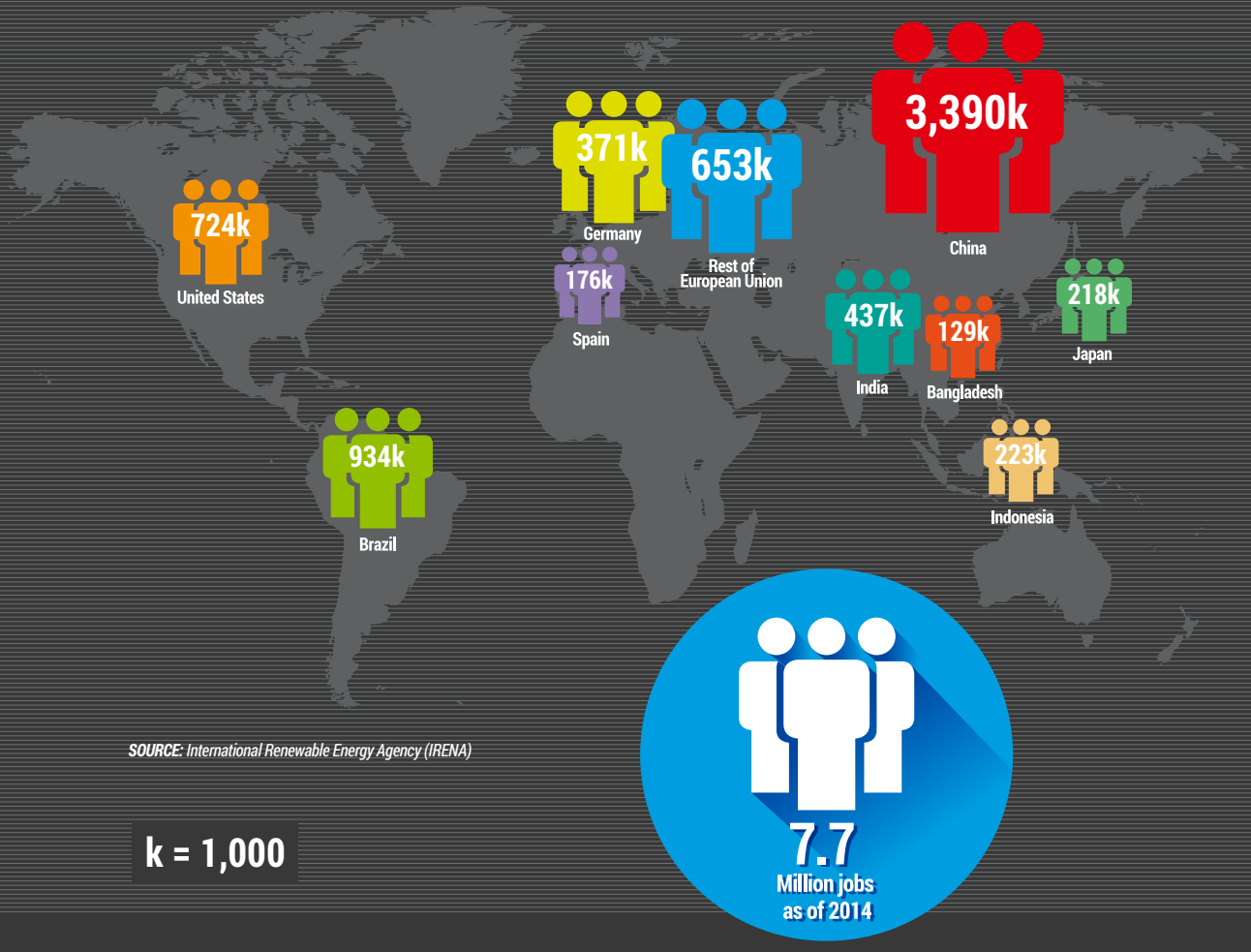
SOURCE: International Renewable Energy Agency (IRENA)

CITIES: A range of global smart transport systems



SOURCE: *Embarq 2013*

Global map of renewable energy jobs 2014



SOURCE: *International Renewable Energy Agency (IRENA)*

k = 1,000

INFOGRAPHIC: WILLIAM ORJUELA, DYNAMO

Zhu Guangyao Ecological Civilization

A national strategy for innovative, concerted, green, open and inclusive development

Zhu Guangyao

Executive Vice President, Chinese Ecological Civilization Research and Promotion Association, former Vice Administrator of Chinese National Environmental Protection Administration

The Chinese government always attaches great importance to environmental protection, adopting a series of major measures in promoting sustainable development. Since the turn of the 21st century, the Central Committee of the Chinese Communist Party and the State Council have been vigorously progressing sustainable development from both theoretical and practical perspectives with remarkable achievements.

In 2007, the Party's 17th National Congress made political commitments to the world that China will undertake comprehensive, harmonious and ecologically civilized development. Five years later, at the 18th National Congress, the concept of ecological civilization was elevated as the national strategy. A comprehensive national plan for promoting ecological civilization, including both theoretical studies and practical activities, was outlined.

The Congress clearly stated that China must incorporate the idea of ecological civilization into all aspects of economic, political, cultural, and social progress. Actions and activities relating to China's geographical space, industrial structures, modes of production and people's living should all be conducive to conserving resources and protecting the environment so as to create a sound working and living environment for the Chinese people and make contributions to global ecological safety.

In 2013, the Chinese government resolutely declared "war" on pollution, just as it had for poverty eradication. It adhered to the principles of prevention first, supervision at source, control throughout the process and severe punishment for violations. It devoted itself, with grim resolution, to preventing and controlling air, water and soil pollution and successively formulated a series of action plans, including the Action Plan on Prevention and Control of Air Pollution and the Action Plan on Prevention and Control of Water Pollution. The Action Plan on Prevention and Control of Soil Pollution is about to be released.

Ecological civilization is a new concept in the development of human civilization. It refers to material, spiritual and organizational achievements in following objective laws of harmonious human, social and natural development. It is an ethical morality and ideology which realizes harmonious co-existence and sustainable development both among people and between them and nature and society, reflecting the progress of civilization. Introducing this concept enriches and deepens the theory of sustainable development, producing bold innovations and practices to evolve civilization to a higher level.

The essential requirement of ecological civilization is that nature must be respected, accommodated and protected. Green hills and clear water should be recognized as priceless

Photo: © Tyrone Siu / Reuters

Since 2010 the proportion of coal-fired power plants with desulfurization facilities rose from **82.6%** *to* **96%**, *and those with denitration from* **12.7%** *to* **87%**.

treasures. The outdated view that man can conquer nature and ignore the bearing capacity of resources and the environment should be completely abandoned. Conscientious efforts should be made to live in harmony with nature, allowing for a new approach to modernization characterized by such co-existence.

By fostering a social atmosphere which applauds frugality and disparages wastefulness, the values of resource conservation and environmental protection should be highly recognized. Green lifestyles, including energy-conserving, low-carbon, and environmentally friendly consumption should be widely accepted.

China remains committed to the principles, and basic state policy, of conserving resources and protecting the environment and promoting its natural restoration with the understanding that environmental protection and economic development boost each other. For the sake of our environment it will promote green, circular, low-carbon development; preserving our geographical space; restructuring our industrial structure; and modifying the ways of production and changing people's behavior. China continues to draw on reform, openness, and scientific innovation as fundamental driving forces, establishing a sound framework of institutions on ecological progress, and developing a long-term mechanism to ensure the progress of ecological civilization. China will stick to giving priority to cultivating ecological culture, incorporating ecological civilization into the core value system of the public by strengthening publicity and education.

The outdated view that man can conquer nature and ignore the bearing capacity of resources and the environment should be completely abandoned.

Specifically, the target is to make breakthroughs in building a resource-saving and environmentally friendly society by 2020. By then, the mapping out and construction of the major functional development zones will be accomplished; the quality and efficiency of economic development will be markedly enhanced; ecological civilization will become a widely accepted value by the whole society; and the levels of ecological civilization will meet the requirements of building a prosperous society.

Major tasks shall be strictly executed for reaching these targets: reinforcing the positioning of the major functional

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zones; optimizing land space; promoting technological innovation and structural adjustment; improving the quality and efficiency of development; pushing forward resource saving and using recycling; changing the development mode; protecting ecosystems and the environment; and instituting rules and policies of ecological civilization in guiding, regulating and constraining all human interferences with nature.

2015 was the most progressive year in constructing ecological civilization, with quite a number of important measures enforced. After enacting the revised Environmental Protection Law, the Chinese government issued a series of regulations and policies such as "The Suggestions on Accelerating the Construction of Ecological Civilization" and the "Integrated Reform Plan for Promoting Ecological Civilization". These clearly sketched the blueprints for constructing ecological civilization. In particular, the Report of the 13th Five-Year Plan (2016-2020) for Economic and Social Development further outlined a comprehensive plan for promoting ecological civilization in the next five years. It laid down that it is necessary to firmly establish and earnestly implement the concept of seeking innovative, coordinated, green, open and inclusive development and to adhere to the principles of developing the country and bringing benefit for all in an environmentally-friendly way.

It added that China should strive to improve the ecological environment, provide more high-quality ecological products; and foster an atmosphere that encourages resource-conserving and environmentally friendly modes for both development and social life, so as to realize the dream for a well-off, prosperous and beautiful China.

Since the year of 2000, especially after 2012, the Chinese government has strengthened its effort in promoting ecological civilization from both theoretical and practical perspectives and has achieved satisfactory results.

2015 was the most progressive year in constructing ecological civilization, with quite a number of important measures enforced.

Photo: © Jason Lee / Reuters

Power generating capacity of **84 million kilowatts** *was transformed to Ultra Low Emission Coal-Fired Power Plants, and the coal burning facilities for another* **81 million kilowatts** *are undergoing transformation.*

The concepts of ecological civilization and sustainable development are deeply rooted in the Chinese people's minds. With the implementation of the Twelfth Five-Year Plan for National Economic and Social Development of the People's Republic of China (2011-2015), daily sewage treatment capacity rose by an additional 48 million tons in urban areas, to total 175 million tons.

Since 2010 the proportion of coal-fired power plants with desulfurization facilities rose from 82.6% to 96%, and those with denitration from 12.7% to 87%. Power generating capacity of 84 million kilowatts was transformed to Ultra Low Emission Coal-Fired Power Plants, and the coal burning facilities for another 81 million kilowatts are undergoing transformation. (The ultra-low emission control technology ensures low coal consumption and enhances the global competitiveness of China's coal-fired power generation.) Targets for reducing emissions of chemical oxygen demand (COD), ammonia nitrogen, sulfur dioxide, and nitrogen oxides were met ahead of schedule, and areas affected by acid rain were reduced to 1990s levels.

The international community applauded the Chinese measures and progress in promoting ecological civilization. In February 2013, UNEP's 27th council meeting adopted a decision in promoting China's ecological civilization.

In April 2014, the UN Alliance of Civilizations and the International Ecological Safety Collaborative Organization founded a sub-committee on ecological civilization. Thanks to the active exploration and unremitting efforts by the Chinese people, China's theoretical study and practical work on ecological civilization are being further recognized and supported by international communities. ▲

Murilo Portugal
Greener Finance

We must harness the financial system to channel flows to enterprises that are in tune with sustainable development.

Murilo Portugal

President, Brazilian Federation of Banks (Febraban)

The Paris Agreement has sent clear signals to markets and to the financial sector that more than 190 countries are going to vigorously pursue the transition to a low-carbon economy that's resilient to mounting climate change. It is no longer a question of if this transition will happen, but of how fast. Some of the key changes required lie outside the financial sector, such as changing relative prices of harmful goods and services vis-à-vis those that benefit the environment and the development of new technologies to facilitate changes in consumption patterns. Finance, however, has an important role to play.

As with all major changes, the transition to a low-carbon economy poses challenges and opportunities. One opportunity lies in harnessing the innovative capacity of the financial system to channel a larger share of the world's saving flows to wealth-creating enterprises that are in tune with sustainable development. Some of the financial tools that need to be deployed have been identified in the UNEP's Inquiry report, The Financial System We Need. I was delighted to serve on the Inquiry's Advisory Council, scrutinizing the diversity of innovations in market practice and policy action that are growing around the world.

One of the Inquiry's most striking findings was that emerging and developing countries are often leading this quiet revolution. I believe Brazil to be one of those leaders, fostering an ecosystem of sustainable finance, blending public and private initiatives. As far back as 2007, the BOVESPA stock exchange introduced its Corporate Sustainability Index, part of the wider global movement of Sustainable Stock Exchanges. More recently, in 2014, the Central Bank of Brazil introduced requirements for all banks to establish socio-environmental policies and risk systems as a routine part of bank governance. Alongside these efforts, FEBRABAN, the Brazilian Federation of Banks, has also introduced a self-regulation framework for its members.

These actions give Brazil firm foundations to build on – and we can do more by focusing particularly on three key priorities.

The first is to find new ways to mobilize capital for the green economy. One promising innovation is the rapid growth of the "green bond" market, where global issuance grew to US$42 billion in 2015. This is still a tiny fraction of the US$100 trillion global bond market, but market players and financial authorities in such emerging economies as China and India are taking steps to move it to the next stage.

In Brazil, Febraban has carried out initial research with Getúlio Vargas Foundation, a leading Brazilian think tank, to scope the market potential, looking at opportunities in the key agri-business area, as well as in clean energy. This year offers the chance for key stakeholders in Brazil to come together to design a green bond roadmap for the country.

A second priority is to better understand how environmental factors can affect the financial risks faced by banks and other institutions. The changing climate – and resource stress such as drought or extreme weather events – can potentially have serious implications not just for the clients of banks, but also for the resilience of their own operations. More and better information on those risks can help

Without clear indicators, we will not be able to measure progress towards a sustainable financial system.

Photo: © Vanessa Carvalho

One promising innovation is the rapid growth of the "green bond" market, where global issuance grew to **$42 billion** *in 2015.*

practitioners assess their portfolios and use scenarios analysis to improve their understanding of the implications of a shifting exposure to environmental factors, including low-probability but high-impact tail risks. International cooperation to develop disclosure standards and common methodologies and tools would be a useful next step.

Finally, without clear indicators, we will not be able to measure progress towards a sustainable financial system. It is hard to manage what is not measured. Currently, however, we lack a shared set of metrics at the international level. To tackle this in Brazil, Febraban and Getulio Vargas Foundation have undertaken the first assessment of the amount of financial resources that are currently allocated by the main banks in the country towards the green economy. The first results indicate that the total amount of "green finance" allocated to corporate clients was US$45 billion in 2014, or 9.6 per cent of total corporate lending.

The largest segment was sustainable transport, followed by agriculture and renewable energy. Again, international collaboration is essential here to develop common methods to enable aggregation of data worldwide and comparison across countries.

Global cooperation is now intensifying, building on action at the national level. One example is the recent launch of a new task force on Climate Change Disclosure by the Financial Stability Board. Another is China's decision to establish a new green finance study group as part of its presidency of the G20 group of nations in 2016. These initiatives present opportunities to mainstream sustainability into the world's largest financial systems.

If we bring together the best of private action with smart policy frameworks at both the national and international levels, we can make 2016 a greener year for finance. ▲

One of the Inquiry's most striking findings was that emerging and developing countries are often leading this quiet revolution.

UNEP at Work

Costing the Gender Gap

Photo: © Mike Hutchings / Reuters

Women form a large proportion of the agricultural labour force in sub-Saharan Africa and play a vital role in ensuring family nutrition and food security. But gender-based inequalities in access to and control of productive and financial resources are inhibiting agricultural productivity and reducing food security. At the same time, a changing climate means that there is a shrinking window to close the gender gap in agriculture and seize the prospects for promoting women's empowerment, economic development and resilience to shocks.

A recent study measuring the economic costs of the gender gap in agricultural productivity in Malawi, Tanzania and Uganda provides strong evidence that reducing the gender gap could translate into significant poverty reduction and improved nutritional outcomes. The study was the result of a collaboration between UN Women, the UNDP-UNEP Poverty-Environment Initiative and the World Bank. The study found that, in two of the three countries, a large part of the gender gap could be attributed to differential access to male family labour. This was largely due to the fact

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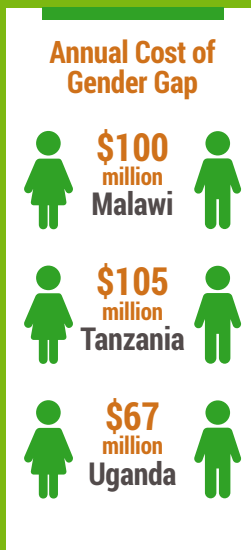
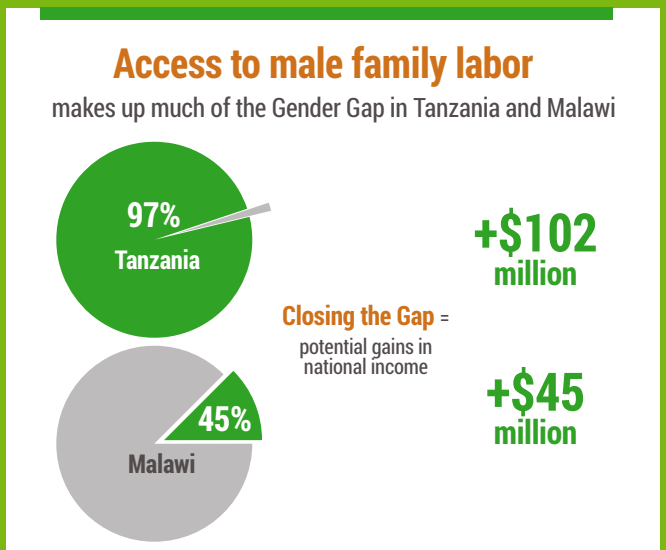
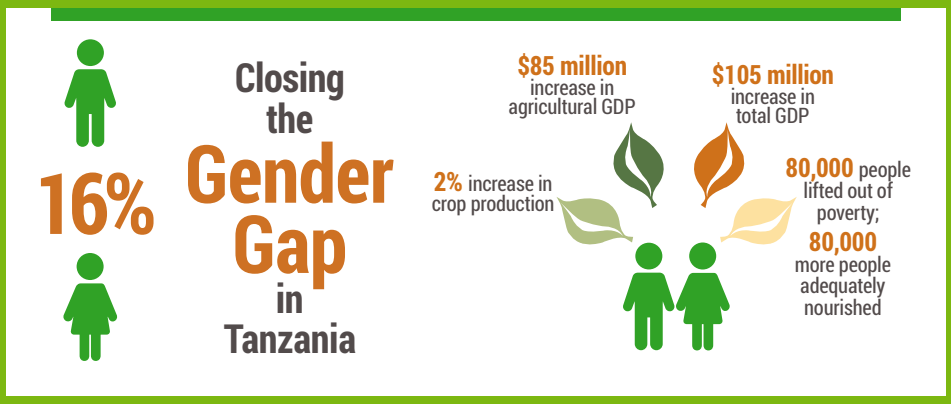
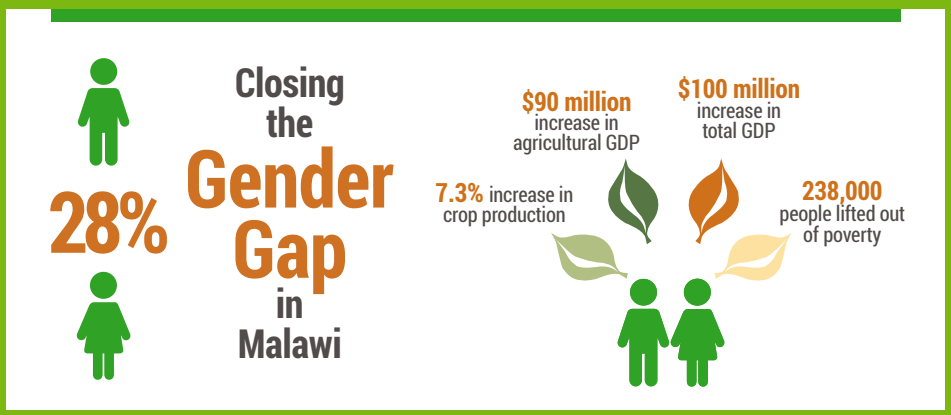








The gender gap costs Malawi $100 million, Tanzania $105 million and Uganda $67 million every year.

that the majority of women farm managers in these countries were widowed, separated or divorced. Women farmers in all countries were also less likely to grow high-value cash crops than men, and less likely to have access to agricultural implements and machinery.

The report provides a unique quantification of the costs in terms of lost growth opportunities and an estimate of what societies, economies and communities would gain were the gender gaps in agriculture to be addressed.

The gender gap costs Malawi $100 million, Tanzania $105 million and Uganda $67 million every year. Closing the gender gap could lift as many as 238,000 people out of poverty in Malawi, 119,000 people in Uganda, and approximately 80,000 people in Tanzania every year. These striking findings send a strong signal to policy makers and development partners that closing the gender gap is smart economics.

See more at: ***http://bit.ly/1L1KgYc***

Nicole Lederer
People's Power

Employment is booming as the world enters the clean energy economy.

Nicole Lederer

Chair and co-founder of Environmental Entrepreneurs (E2)

You may not have felt the ground shaking, but the energy world underwent a seismic shift in 2015. The impacts of the Paris climate agreement, and other energy policy advances, on people everywhere in the world and at every level of the economy will be beneficial and profound. Last year launched us all in into the 21st-century clean energy economy, and 2016 is the year that true democratization of energy begins.

The US Clean Power Plan, which sets our nation's first-ever limits on carbon emissions from power plants, is a great example of transformative energy policy. It will stimulate innovation in technologies like low-carbon energy generation, efficient energy storage and transmission, energy efficiency for buildings, low-carbon transportation, and grid modernization. Since markets for these technologies will be ever-expanding, entrepreneurs are responding by starting new companies that create jobs. In fact, according to the upcoming "Clean Jobs America" report by Environmental Entrepreneurs (E2), the US-based, non-partisan group I chair, hundreds of thousands of people already work in clean energy in America – and employment in the sector grows every day.

More than 208,000 people work in the US solar energy sector alone, a 20 per cent increase over last year. Solar is adding jobs at a rate that's ten times faster than in the rest of the American economy.

Solar jobs attract a lot of attention, but the clean energy jobs that E2 tallied cross multiple sectors. They include machinists who manufacture wind turbine blades, carpenters who retrofit schools to make them more energy efficient, chemical engineers who develop advanced biofuel technologies, and military veterans who are now deploying as civilians in the fast-growing and technology-driven precision agriculture industry. Up and down international supply chains, good clean-energy jobs are proliferating.

The Clean Power Plan isn't the only US policy sending a strong market signal to clean energy businesses to increase capital investments and scale up their workforce. Innovative state-level policies are also pioneering new ways to encourage and reward low-carbon energy.

Where I live in California, for example, Governor Jerry Brown signed a law last year that ensures we will generate half our electricity from renewable resources by 2050. That's on top of our Global Warming Solutions Act of 2006, which created an economy-wide cap-and-trade system for reducing carbon emissions, and our Low Carbon Fuel Standard, which lowers transportation sector emissions. While these laws have obvious climate benefits, they've also incentivized innovation in information technology, automotive design, water efficiency, and agriculture.

The successes we've had in this state, which has an economy larger than India's, can serve as an international model. As Governor Brown said in December: "California has cut carbon pollution and grown its economy at the same time – and so can the rest of the world".

One attribute of a clean energy economy is that by providing opportunities to earn – and save – money, it extends benefits to people across diverse income levels. For example, as solar expands across my state, it's increasingly deployed in low- and middle-income areas. Innovative financing models allow property owners to install solar

Photo: © Dennis Schroeder / NREL

According to the International Renewable Energy Association, renewable energy employed **7.7 million people**, *directly or indirectly.*

panels with little or no up-front costs, and rate-payers realize energy bill savings – in perpetuity. At the same time, workers who install and maintain these panels are often employed by small, local companies. Distributed energy generation and improved efficiency also provide greater stability and energy security. These benefits are affordable and inclusive – for workers, for consumers, and for businesses seeking to boost their bottom lines.

While US businesses closely watch federal and state policies, they also welcome participation in the global transition to clean energy. In the wake of the Paris climate agreement – which received strong support from the US business community – companies are realizing the gargantuan emerging economic opportunity of democratizing global energy systems. In short, they view the Paris agreement as the mother of all market signals.

According to a recent Standard & Poor's report, carbon-reduction pledges made in Paris by China and India alone could double the world's solar capacity within 15 years. To meet every nation's commitment, a staggering amount – $16.5 trillion – in investment is needed by 2030, according to S&P.

Solving climate change is the central environmental challenge of our time, but it's also this century's defining economic opportunity.

That means jobs, both in the U.S. and around the world. According to the International Renewable Energy Association, renewable energy employed 7.7 million people, directly or indirectly, in 2014. Mirroring the growth of the U.S. solar sector, international renewable energy jobs grew 18 per cent over the previous year's data.

To keep this growth going – to expand a virtuous cycle of ever-stronger carbon-reduction policies that spur more innovation and investment, more economic growth, and more jobs – there are some steps we can take, right now, in both the US and abroad, that help build upon the remarkable international momentum from Paris.

First, we must apply pressure on elected officials and policymakers. For my part, for example, I'll remind energy ministers from around the world - when they meet in June for their seventh Clean Energy Ministerial in San Francisco - that the private sector demands strong climate action from their governments.

Second, we must urge all countries to officially sign the Paris agreement on April 22 at the United Nations in New York, then accept the agreement through their own domestic processes as soon as possible.

And third, we must ensure carbon-reduction commitments made at the climate summit are updated in a transparent way that holds countries accountable for their results.

Solving climate change is the central environmental challenge of our time, but it's also this century's defining economic opportunity. By providing more stability, security, and jobs, the new clean energy economy allows us to power our future with resources accessible to all. ▲

Emily Benson
Oliver Greenfield
Green and Fair

The success of green economies hinges on how inclusive they are.

Emily Benson

Programme Manager of the Green Economy Coalition

Oliver Greenfield

Convenor of the Green Economy Coalition

The richest 1 per cent of the world's population now controls 50 per cent of global assets, while the poorest half owns just 1 per cent – and that gap is set to widen. At the same time, 60 per cent of the world's ecosystems are degraded. If ever there was a need to rewrite the economic rulebook, it's now.

The shoots of green growth have matured quickly in the last five years. Technological advances have made real what once seemed implausible; the price of renewables has dropped drastically and financial flows are gathering pace. Low-carbon green economy plans are emerging in more than 40 countries and the outcome of the Paris climate conference will accelerate that trend.

The opportunity of greener growth has also prompted a bigger, more important conversation about the future of economies. Through the many Sustainable Development Goal (SDG) dialogues – in countries rich and poor, at local, national and global levels – two messages have been consistent. Communities have felt excluded and marginalized from the "brown" economy. And experience proves that "green" policies will struggle to make a long-term impact unless they deliver what communities need. The success of a transition will hinge on its inclusivity.

In 2000 Germany embarked on a seemingly impossible mission, moving Europe's premier industrial economy over to low-emission and renewable energy sources. Sixteen years later the "Energy Transition", *Energiewende*, has worked. Technological advances, a growing concern about climate change and a strong evidence-based discourse were all important in driving the change. But, above all, the policy drive has succeeded because it evolved from long-term grassroots action: the transition has been owned not by governments or companies, but by people. Today, over 900 cooperatives across the country enable citizens to run their own wind turbines and solar parks; 46 per cent of installed renewable capacity in Germany is citizen-owned.

There are many other glimpses of an inclusive green transition. The Durban Climate Change Strategy evolved through extensive community consultation and put poorer people at the heart of its response. The National Greening Programme in the Philippines has set aside $650 million to plant 1.5 billion trees, aiming to create livelihoods for poor and marginalized communities.

Since its inception, the Green Economy Coalition (GEC) has insisted on a green economy that generates a better quality of life for all within the planet's limits. Inclusive really means fairer – more equal opportunities and outcomes. An inclusive transition empowers people marginalized by gender, age, disability, ethnicity, caste and livelihood type; it also shares global assets fairly. In a world of finite resources, "prosperity for all" means that developed countries are expected to take the lead, consume less resources and help lift people out of poverty.

Above all else, our remit is focused on the mechanics of inclusion, starting with dialogue. In the next three years we will be working with partners to convene dialogues in Peru, Mongolia, Senegal and Uganda and supporting our existing civil society hubs in South Africa, India and the Caribbean. Green growth planning processes are underway in all these countries and regions. Our task is to support our partners in bringing diverse voices – trade unions, civil society, small businesses – to shape and own the agenda.

Photo: © Gonzalo Fuentes / Reuters

Experience proves that "green" policies will struggle to make a long-term impact unless they deliver what communities need.

The National Greening Programme in the Philippines has set aside **$650 million** *to plant* **1.5 billion trees**, *aiming to create livelihoods for poor and marginalized communities.*

The GEC is supporting communities who have struggled to gain a foothold in the "brown" economy. International green growth initiatives have so far been silent about informal markets. With up to 80 per cent of the workforce in many poor countries, informal markets are not a minor subset of our global economic activity – but where the poorest trade, live and make their livelihoods. We want a new policy agenda, one that focuses on the role of informality in the transition to greener economies.

Entrepreneurs and small and micro businesses will drive the transition on the ground. We have helped develop the first online platform, GreenEcoNet (www.greeneconet.eu), to connect small, medium and micro businesses (SMMEs) and help them promote their green solutions to wider markets. This network demonstrates the momentum for a small, green and inclusive transition. Its members include an Estonian business that partnered with a Bangladesh textile factory to produce garments using leftover fabric, and an Indian SME that has developed bio-digester toilets for rural communities. Sustainable consumption for the many will only succeed when the smallest businesses or communities are included, and have access to green solutions pioneered elsewhere.

Globally we have been working with the international institutions that are leading the green growth agenda, championing "inclusivity" in the context of green growth planning. Now that the issues of inclusion and fairness are firmly at the top of the agenda, we want to ensure that the voices of under-represented constituencies – the small, informal, and forgotten – can shape and own green international policy interventions to meet their needs.

There are no simple policy prescriptions for ensuring that green growth is owned by and benefits the majority. We are all learning as we go.

However, the experience of our partners and members highlights four key ways forward:

1. We need governance that is inclusive, nationally owned and transformative. Policy and institutional reforms at the national and global levels are the real drivers of progress.

2. We need to empower poor women and men and support their livelihoods, rights and capital assets. The excluded should be given the chance to "own" a participatory transition process, and local governments should be active in the change. We should focus on helping poor people build and better use their assets for their own benefit.

3. Economic structures and financial mechanisms must become more accessible, and they must prioritize the informal economy and SMMEs. Natural resource revenues should be managed to benefit the poor, who should not be saddled with a disproportionate share of the costs of the transition to a green economy. The full range of investors – including the poor themselves – should be recognized, mobilized and linked.

4. We need solid metrics for inclusive green growth. Parallel initiatives on better metrics for wellbeing, economic progress and environmental sustainability should be brought together, and they should put a greater emphasis on inclusion. Such metrics should be used to inform policies and broaden our understanding of market signals.

The opportunities of green growth have catalyzed a deeper debate about the purpose and aims of our economic system. This momentum will drive a transformation. It is a chance for communities to rewrite the rules that govern our economy, this time for the majority. ▲

Mao Amis
Green Means Grassroots

The green economy discourse needs to be brought much closer to the people.

Mao Amis

Co-Founder and Executive Director, African Centre for Green Economy (AfriCGE)

It's good that the discourse on the green economy is starting to put more of an emphasis on inclusion, viewing the benefits of transition not just from an environmental perspective, but also for its social and economic outcomes. But if we are going to achieve an inclusive green economy, we must first be inclusive in shaping its agenda.

To develop long-term solutions with strong local buy-in, we must listen to those who face the brunt of the world's environmental challenges. Until recently, the green economy discourse has focused at the macro-economic level and been characterized by high-level interventions; the effect on vulnerable populations has been negligible at best.

The current droughts in parts of Southern Africa and the Horn of Africa are good examples of the kind of challenges we will face if climate change and variability is not contained. It's estimated that, in 2016, 14 million people in Southern Africa will suffer from severe hunger as a result of the current drought caused by El Niño. South Africa, which used to be a net exporter of maize, needs to import more than 5 million tons of the crop to meet its national needs.

Since agriculture is the backbone of most African countries, one would think that climate change adaptation would be mainstreamed so that droughts and other such incidents could be contained. This is not happening, partly because the messages are not trickling down effectively to those on the frontlines: smallholder farmers and local communities.

For the last four years, the African Centre for Green Economy (AfriCGE), has been working to build platforms to enable us to bring the green economy discourse closer to the people, and showcase the kinds of tools and approaches available for climate change adaptation.

We engage with communities, entrepreneurs, and business leaders on an almost daily basis in East and Southern Africa. It's quite apparent that even though we talk of an inclusive green economy, it's not inclusive at all; it is still perceived as an environmental issue, as opposed to an overarching framework for achieving sustainable development. Many people still don't understand that all sectors of the economy need to act if we are to transition to a low-carbon, resource-efficient development pathway. And when we talk about sectors to engage, the informal economy does not feature.

Yet the informal economy presents the best opportunity to achieve inclusivity through entrepreneurship. Africans are very entrepreneurial people, with a vibrant informal economy that has played a crucial role in lifting millions out of poverty. In 2015, Uganda was recognized as the most entrepreneurial country in the world. In South Africa alone, the informal economy is estimated to be contributing up to

Photo: © Andreea Campeanu / Reuters

If we are going to achieve an inclusive green economy, we must first be inclusive in shaping its agenda.

Photo: © Rogan Ward / Reuters

US$18 billion per annum to GDP, with an estimated density of 10 enterprises per 1.5km² in informal settlements.

Entrepreneurs who operate at the base of the pyramid have clearly seen the opportunities presented by a transition to a green economy. This is evident in the exponential growth of start-ups, spanning a wide range of sectors including sustainable agriculture, waste management, transport and sustainable housing.

If we are to build an inclusive green economy, then we need to move away from the rhetoric that has characterized the discussions to date, and shift to radical experimentation on the ground. We can't talk of an inclusive green economy if we don't understand the kind of business models that can create mass jobs to cater to the 11 million African youths who will soon need them every year. Even though the informal economy is a significant contributor to economic development, these low-income areas are often underserved – with most lacking basic infrastructure – making them a difficult environment in which to do business.

Entrepreneurs who operate at the base of the pyramid have clearly seen the opportunities presented by a transition to a green economy.

In South Africa alone, the informal economy is estimated to be contributing up to **US$18 billion per annum** *to GDP.*

This persists partly because the role of the informal sector in contributing to the mainstream economy has not been recognized. The same can be said about the lack of voices from the informal sector (and from Africa in general) in contributing to the discourse on green economy. The result is a lack of traction on some of the interventions that are designed to mainstream this agenda in many African countries.

Last year we launched the New Economy Accelerator, which aims to incubate green entrepreneurs at the base of the pyramid and enable them to scale up their enterprises for wider impact. The Accelerator also serves as a test of the kinds of business models required for building an inclusive green economy. This approach allows us to do radical experimentation with green entrepreneurs on the ground, while seeking to change the narrative on the green economy to make it contextually relevant, while pushing for local investments.

We build alliances and networks to infuse our voices at the global stage, and to close the gap between high-level global green policy processes and local initiatives and participation. Our partnerships with groups such as the Green Economy Coalition and the New Economics Foundation have played a critical role in amplifying our voices.

Adopting an inclusive green economy approach presents the best opportunity for addressing Africa's systemic challenges of poverty, malnutrition and a general lack of access to basic services such as energy. To capitalize on this opportunity, however, we must radically rethink how the green economy discourse is framed, and by whom. If this concept is to have an impact and change lives on the ground, then it will need strong leadership from the grassroots level. That's our key motivation. ▲

Elizabeth Thompson
Breaking New Ground

Barbados pioneered ambitions for a green economy and is now ready to take the next step towards implementing them.

Elizabeth Thompson

Former Minister of Energy and Environment, Barbados, Executive Co-ordinator of the Rio +20 conference, and UNEP Champion of the Earth

Back in March 2007, during his annual presentation of the government's economic proposals in Parliament, the then Prime Minister of Barbados, the Rt. Hon Owen Arthur, used these words to launch a comprehensive National Green Economy Policy for Barbados. The policy was designed "to integrate green principles into national economic planning, marrying economic growth with environmental management and preservation."

At the time, no one recognized that a global precedent was being set. It would be another five years before the international community would embrace – in the outcome document of the Rio+20 Conference on Sustainable Development in 2012, "The Future We Want" – the value of the green economy "as one of the important tools available for achieving sustainable development."

Important lessons emerge from the early chapters of the Barbados story. The first is that innovative policy and examples of best practice can come from the developing world and from Small Island Developing States (SIDS). Another is that a green economy policy signals the kind of new direction that would be resisted by entrenched interests that derive certainty, power, profit or other benefits from the status quo. Hence, an announcement coming directly from the Head of Government demonstrated the high level of priority that government attached to the new policy direction.

Yet another important lesson in the story of Barbados's national green economy came less than a year after its launch, in the form of a general election and a new government. National policies frequently change or fail, not because they are without value but because the pendulum swings of the political cycle militate against continuity and successful implementation. Barbados escaped this political pitfall when the new administration adopted the policy in its entirety. Significantly, in the foreword of the Barbados Green Economy Scoping Study of 2012, the current Prime Minister, the Hon. Freundel Stuart expressed his administration's commitment, noting: "The green economy debate recognizes our structural vulnerabilities, offers a model to assist us in further realizing our sustainable development aspirations, and creates the institutional platform that would enable us to participate in innovative partnerships in the fight to save our planet."

The government of Barbados is trying to create transformational and disruptive change and innovation.

Photo: © Loozrboy / Flickr

At the time, no one recognized that a global precedent was being set.

Exporting solar water-heating systems saved foreign expenditure on fossil fuels. Figures from the Central Bank of Barbados and USAID indicate that between 1974 and 2009, this industry saved the country **US$410 million** *in foreign exchange expenditure.*

Building on successful models, leveraging core competencies, and maximizing competitive and first-mover advantage are techniques usually employed in the corporate world, but they also describe what Barbados has been trying to do. A green economy policy was not a far reach for the country, as it had already benefited substantially from its indigenous solar water-heating industry, which reduced carbon emissions, created decent work, generated revenues from exporting solar water heating systems throughout the Caribbean and saved foreign expenditure on fossil fuels. Figures from the Central Bank of Barbados and USAID indicate that between 1974 (when it began) and 2009, this industry saved the country US$410 million in foreign exchange expenditure.

"Disruptive change" – an expression coined by Harvard Business School professor Clayton Christensen – describes new product innovations, models, services, processes or practices that disrupt the status quo, creating new value systems that transform an organization or market in a way that benefits the consumer. In pursuing a green economy, the government of Barbados is trying to create this kind of transformational and disruptive change and innovation.

The government has taken a number of good steps towards achieving its objective, including by identifying five sectors – agriculture, fisheries, building/housing, transport and tourism – for particular attention; starting a national dialogue; holding national multisectoral consultations; setting up an interministerial, technical steering committee; engaging the private sector and civil society; involving the University of the West Indies; partnering with UNEP to access international expertise; and using both national and international partnerships to enhance public sector capacity. A corollary policy seeks to promote a greater percentage of renewables in the national energy mix and aims for greater energy efficiency.

Nearly nine years after its introduction, we are well past the opening chapters of the Barbados green economy story. The government has crafted a policy with a distinctively Barbadian DNA, but implementation has been slow. There has been much discussion about developing national metrics and sustainability indicators, but they are still outstanding. No roadmap is in place to establish targets, benchmarks, indicators and time frames for actualizing the policy and its constituent elements; as a consequence, there remains policy dissonance. So what is needed to accelerate implementation and entrench the policy across all ministries, sectors and stakeholders?

Disruptive change must be carefully managed and this is particularly true when policy intervention is being used to precipitate the disruption. Christensen argues that in such circumstances there is a need for a dedicated leader of the process, as the change will not occur while a government is immersed in the exigencies of managing daily events. Appointing a manager with the appropriate authority, supported by a unit with specific responsibility for making the green economy a reality, is now a necessity.

The Barbados Green Economy Policy is a groundbreaking instrument. The path of the pioneer is rarely smooth or predictable, but the country already has the core elements for full and successful implementation. With the right leadership, the story may well have the kind of happy ending to which Barbadians rightly aspire. ▲

Valuing the Invisible

A new initiative explores how today's agro-ecological systems are suffering from a distorted economic and policy environment.

Photo: © Shutterstock

Agricultural systems deliver many benefits to society. An industrial cornfield in the United States might yield several hundred bushels of corn per year for processing into foodstuffs, animal grain or ethanol, which could be exported and consumed halfway across the planet. Meanwhile, a cooperative of small-scale cocoa farms in the Congo Basin could feed up to 80 per cent of the local population, employ dozens of producers and sustain the livelihoods of countless local families.

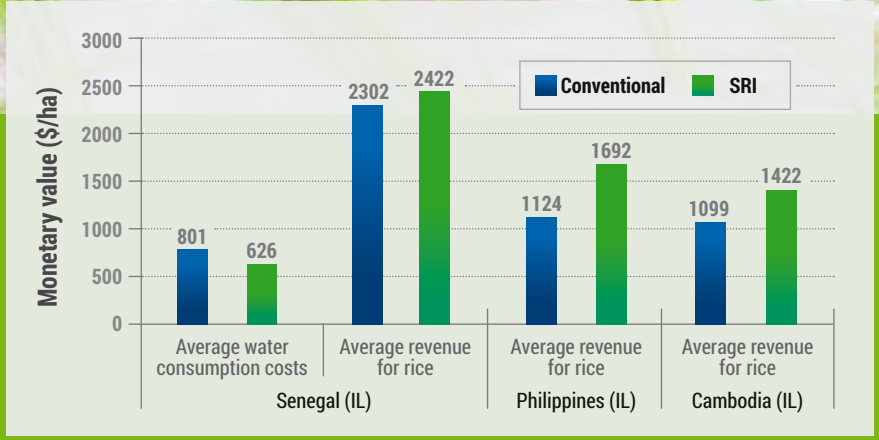


Photo: © Mathias Ripp

Agriculture and food systems provide a vast array of values, both positive and negative, that are economically invisible.

In economic terms, these values are largely *visible* in the sense that they can be measured and accounted for in global and national economies. But agriculture and food systems also provide a vast array of values, both positive and negative, that are economically *invisible*.

For example, agricultural production systems create significant costs to human well-being, largely in the form of health impacts during production (exposure to agrochemicals and antibiotics) and consumption (malnutrition). Moreover, ecosystem degradation and biodiversity loss, a considerable portion of which is caused by agricultural production itself, undermine the natural resource base that the agricultural sector – and society as a whole – rely upon.

But farming landscapes also provide invisible *positive* values in that they are an important source of cultural heritage and social cohesion. And rarely are the invaluable contributions of nutrient cycling, pollination, pest control and water flow from catchment areas reflected in national agricultural production accounts.

The Economics of Ecosystems & Biodiversity (TEEB) (*www.teebweb.org*) is a global initiative, hosted by the United Nations Environment Programme (UNEP), focused on "making nature's values visible". Its principal objective is to mainstream the values of biodiversity and ecosystem services into decision-making at all levels. "TEEB for Agriculture & Food" (TEEBAGFOOD, *www.teebweb.org/agriculture-and-food/*) is a research initiative that will apply the TEEB approach in the context of agriculture and food, providing detailed insight into the importance of ecosystems and biodiversity, and the (visible and invisible) impacts of different production systems on human and ecological well-being. The initiative will also showcase policy opportunities for sustainable development.

An interim report launched in December 2015 provides a first look at what this study seeks to achieve. Preliminary findings from a number of exploratory studies on livestock, rice, agroforestry, inland fisheries and palm oil reveal some critical insights into how today's agro-ecological systems are suffering from a distorted economic and policy environment.

The initiative will produce technical reports on the scientific and economic foundations of the "eco-agri-food systems complex", as well as the policy dimensions of this work. The latter component will identify a range of possible policy interventions across different stages of the value chain and offer specific recommendations on how policy-makers and businesses can facilitate a transition towards more sustainable agricultural practices.

New UNEP Publications

REDD Academy Learning Journal

The REDD+ Academy is a coordinated REDD+ capacity development initiative led by the UN-REDD Programme and the UNEP Environmental Education and Training Unit, which seeks to match the scale of the global climate change mitigation challenge and enable systematic, focused capacity development to deliver REDD+ on the ground.

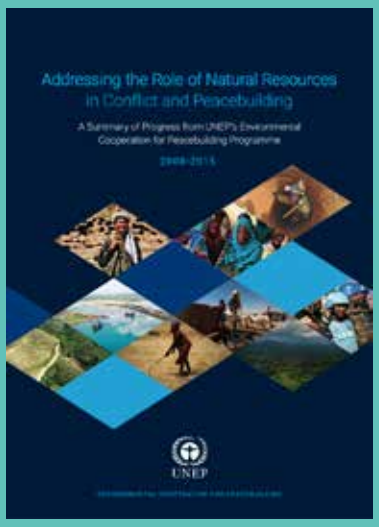
The REDD+ Academy is a comprehensive response to capacity building needs identified by the countries receiving support from the UN-REDD Programme. The main aim of the REDD+ Academy is to empower potential "REDD+ champions" with the requisite knowledge and skills to promote the implementation of national REDD+ activities.

Green Energy Choices: The Benefits, Risks and Trade Offs of Low Carbon Technologies for Electricity Production

This summary report highlights key findings from the report of the International Resource Panel: Green Energy Choices: The Benefits, Risks and Trade-Offs of Low-Carbon Technologies for Electricity Production.

Meeting the rising energy demands of a growing world population presents an ideal opportunity to make technology choices that take into account, and to the extent possible, mitigate negative impacts on the climate, environmental and human health.

The report examines the main commercially available renewable and non-renewable power generation technologies, analysing their GHG emissions, but also trade-offs in terms of: Environmental impacts (impacts on ecosystems, eutrophication and acidification.



Addressing Role of Natural Resources in Policy Making, Conflict and Peacebuilding

Preventing, managing and resolving natural resource conflicts is undoubtedly among the key peace and security challenges of the 21st century. Increasing demand for natural resources combined with environmental degradation and climate change will serve to intensify competitive pressures between countries and communities over resource access, ownership and use.

Many experts and governments expect natural resources to become key drivers in a growing number of disputes, with potentially significant consequences for international, regional, and national peace and security.

Highlights of UNEP's Work on the Inclusive Green Economy

Green Economy Report

The Green Economy Report was compiled by UNEP's Green Economy Initiative in collaboration with economists and experts worldwide. The authors debunk several myths and misconceptions about the economics of "greening" the global economy, and provide timely and practical guidance to policy makers on what reforms are needed to unlock the productive and employment potential of a green economy. The report demonstrates that the greening of economies is not generally a drag on growth but rather a new engine of growth; that it is a net generator of decent jobs, and that it is also a vital strategy for the elimination of persistent poverty.

The report confirms that an investment of 2 per cent of global GDP across 10 key sectors is what is required to kick-start a shift to a green economy. The report also seeks to motivate policy makers to create the enabling conditions for increased investments towards such a transition.

The Financial System We Need

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.

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

This report, which was released on the sidelines of the UN General Assembly in September 2015, speaks to the multiple benefits – economic, health, security, social and environmental – that an inclusive green economy can bring to humanity. Such an economic model sees growth in income and employment from investments that reduce carbon emissions and pollution.

The IGE Narrative expands and deepens substantially the focus of UNEP's earlier work on green economy, calling attention to issues such as design principles of an inclusive green economy, the centrality of jobs, and the importance of embracing circular and shared approaches to economic growth.

All UNEP publications are available online at:
www.unep.org/publications

Edward Barbier
Righting the Balance

Overcoming environmental scarcity and inequality through inclusive green growth

Edward Barbier

John S. Bugas Professor of Economics at the University of Wyoming. Author of Nature and Wealth: Overcoming Environmental Scarcity and Inequality, *Palgrave Macmillan, London*

Two major threats face the world: environmental degradation and the growing gap between rich and poor. Historical and contemporary evidence indicates that they are symptomatic of a growing structural imbalance in all economies – how nature is exploited to create wealth and how it is shared among the population. The root of this imbalance is that natural capital is under-priced, and hence overly exploited, whereas human capital is insufficient to meet demand, thus encouraging relatively higher wages for skilled labour and wealth inequality.

This, in turn, has three important economic consequences. First, because natural capital is relatively cheap compared to human capital, producing goods and services uses too much natural resources relative to skilled labour. Second, as the relatively scarce factor of production, skilled workers receive increased real wages and incomes. Third, as the income gap between skilled and unskilled workers widens, wealth inequality worsens. The result is a profound structural imbalance in the modern world economy; global production now uses natural capital excessively, while skilled workers are made much better off, and inequality is increasing.

In recent decades, the processes reinforcing this global structural imbalance have accelerated. Financial capital has become the dominant form of wealth in modern economies, and more of the income and wealth of the rich comes from the financial sector. Moreover, its unchecked expansion has led to greater financial risk and instability, increasing concentration of wealth and global imbalances. Reproducible capital – our conventional "fixed capital" assets comprising factories, machinery, equipment, dwellings, etc. – continues to be overly resource and energy-intensive, and is the main conduit for skill-biased technological change.

As a result, accumulating reproducible capital encourages both more use of natural capital and rising demand for relatively skilled labour. However, human capital accumulation in modern economies – that is, the development of a skilled labour force – is failing to keep pace with this demand, which has caused the wage gap between highly skilled and less-skilled workers to grow. The global outcome is increasing wealth inequality, pockets of poverty, structural unemployment, and increased social polarization. Finally, the under-pricing of natural capital has led to increasing over-use and severe environmental degradation. The result is greater pressure on ecological and natural resources, signaling the emergence of such global environmental problems such as climate change and declining freshwater availability.

One reason for this imbalance is that the current structure of production in the world economy has been mainly determined by the second phase of innovations of the Industrial Revolution. These occurred from 1870 to 1900 and were based largely on electricity and the internal combustion engine, which were in turn made possible by the new hydrocarbons oil and gas, along with coal. Harnessing these technological and economic changes eventually led to the rise of the United States as the leader in 20th century industrialization, which other countries began emulating. As industrialization spread worldwide, fostered by trade in energy and resources, there was a large boost to global productivity, which lasted until the1970s.

This second phase of the Industrial Revolution was an outcome of the fossil fuel era. Since the 1890s, coal, oil and gas have accounted for at least half of global energy consumption. And, despite the rise in renewable energy and nuclear power, they still encompass 80% of energy use worldwide. In addition, as economies became more energy-intensive during the second phase, they also increased their use of non-renewable materials, such as minerals and ores, construction materials and nonrenewable organics, which currently comprise 95 per cent of material consumption. The increased resource and energy

Photo: © Noor Khamis / Reuters

We hide the rising costs of increasing environmental scarcity by continuing to under-price natural and ecological capital.

Since the 1890s, coal, oil and gas have accounted for at least half of global energy consumption. And, despite the rise in renewable energy and nuclear power, they still encompass **80% of energy** *use worldwide.*

use since the early 20th century has also been accompanied by skill-biased technological change, continuously raising the demand for more skilled labour in economic production.

Today's economies are exacerbating this imbalance. We hide the rising costs of increasing environmental scarcity by continuing to under-price natural and ecological capital. And, rather than investing in sufficient human capital to keep pace with skill-biased technological change, we allow skilled labour to become scarce and thus attract excessive wages. It seems that we are prepared to accept the economic and social consequences of excessive environmental degradation and rising wealth inequality.

If we are to address the current structural imbalance, we must tackle these twin problems of excessive environmental degradation and insufficient human capital. This requires transitioning to a more inclusive green economy through a Balanced Wealth Strategy. Such a strategy needs to include policies directly aimed at benefiting the large number of resource-dependent economies and ending the significant pockets of poverty found worldwide. Global market failures – climate change, loss of ecosystems and declining availability of water – need to be addressed as well.

Consequently, the Balanced Wealth Strategy has four key elements:

- Ending the persistent under-pricing of natural capital that leads to its over-use in all economies.
- Ending insufficient human capital accumulation that contributes to increasing wealth inequality.
- Adopting policies targeted at inefficient natural resource use and poverty in developing economies.
- Creating markets to address key global environmental impacts, such as climate change, loss of key ecosystems, and management of transboundary water resources.

The Balanced Wealth Strategy is clearly not without cost, and will require substantial commitments by all economies. But unless such a strategy is pursued – offering the opportunity to transition to a more inclusive economy through green innovation and growth – the current global threats of environmental scarcity and inequality will continue to worsen.

In sum, we face two possible visions of the future. We can persist with the current path of an exclusive but brown economy inherited from the second phase of the Industrial Revolution and the fossil fuel era. Or, the world economy can embark on a third phase of innovation, sustainable growth and economic prosperity. Making the transition to an inclusive green economy will not be easy, but the consequences for the majority of the world's population of the current pattern of depleting nature to accumulate wealth could be bleak, if not catastrophic. ▲

Environmental Champion
Bertrand Piccard

A pioneer, explorer and an innovator who operates outside the customary certainties and stereotypes

Photo: © Solar Impulse / Anna Pizzolante / REZO.ch

Most of us go up or down in the world, but for Bertrand Piccard the alternatives were particularly acute. His grandfather, Auguste Piccard, set altitude records by balloon, becoming the first person to enter the stratosphere and thus observe the curvature of the Earth. And his father, Jacques, set the submarine depth record by descending nearly 11,000 metres to touch the bottom of the Mariana Trench.

Bertrand chose neither direction, deciding instead to go around the Earth – but in new ways, by balloon and solar-powered aircraft. But he is following in their footsteps as an environmentalist. His grandfather – who made modern aviation and space travel possible by inventing the pressurized cabin – advocated the use of solar energy and heat pumps as early as 1942. And his father helped persuade governments to abandon dumping toxic waste in ocean trenches by showing the world that life existed in the deepest part of the seas, where no one had expected to find it.

Photo: © Jean Revillard

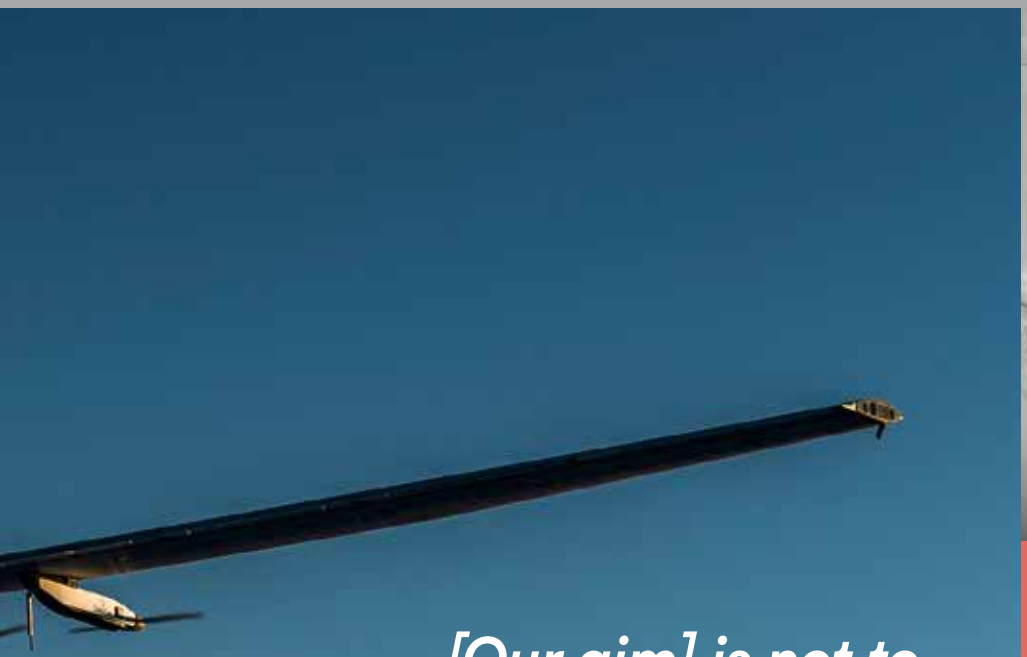


Photo: © Courtesy

[Our aim] is not to revolutionize aviation, but rather to achieve a revolution in the mindset of the people.

Photo: © UNEP

Thus Piccard's current project, an attempt to fly round the world in the 72-metre wingspan Solar Impulse 2 is, as he told *Our Planet*, "in a straight line with my education and with the aspiration to promote the clean technologies that are so important for a better future and for the protection of the environment". He is a UNEP Goodwill Ambassador.

Back in 1999, Piccard and Brian Jones, his co-pilot at the time, completed the first non-stop around-the-world balloon flight, covering 45,755 km in less than 20 days. It taught him a lot. As in a balloon, so in life, he says, you are pushed by the wind at its own speed and direction and when this is wrong you have to "learn how to change altitude – psychologically, philosophically, spiritually – to find better currents, other ideas, influences [or] solutions to enable you to find a more favourable trajectory for the future".

After their flight, he and Jones set up the Winds of Hope Foundation to tackle the neglected Noma disease, which is directly related to malnutrition and poor hygiene. The disease, he says is "a symbol of the imbalance of a world split between a wasteful society and starving populations, between sophisticated technologies and total destitution".

The solar circumnavigation, which began in Abu Dhabi in March 2015, has paused in Hawaii while the aircraft's batteries undergo repairs; the journey is scheduled to restart in April 2016. The aim of the trip, he says, "is not to revolutionize aviation, but rather to achieve a revolution in the mindset of the people. All the old polluting devices that the world is using today can be replaced by clean technological solutions. This will create jobs and profit, while at the same time protecting the environment."

He goes on: "People have to understand that tackling climate change is a profitable opportunity, rather than an expensive problem." He adds that the public will become mobilized only "if we emphasize the tangible benefits of existing clean solutions".

And he calls on environmentalists to "stop threatening human mobility, comfort and economic development in order to protect nature. Asking people to make sacrifices for no immediate return only creates resistance. Who would renounce driving their car because of sea levels rising in 30 years? On the contrary, let's demonstrate that everyone can maintain, and even improve, their standard of living thanks to affordable and accessible clean technology solutions, while reducing the impact of their lifestyle on the environment."

Thus he concludes, we should "act in the interest of today's generation and not only for future generations. Very few people will change their current behaviour in favour of those living in the future. Let's demonstrate that the changes we need can already deliver a favourable result [for] today's economic, industrial and political development."

UNEA-2

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