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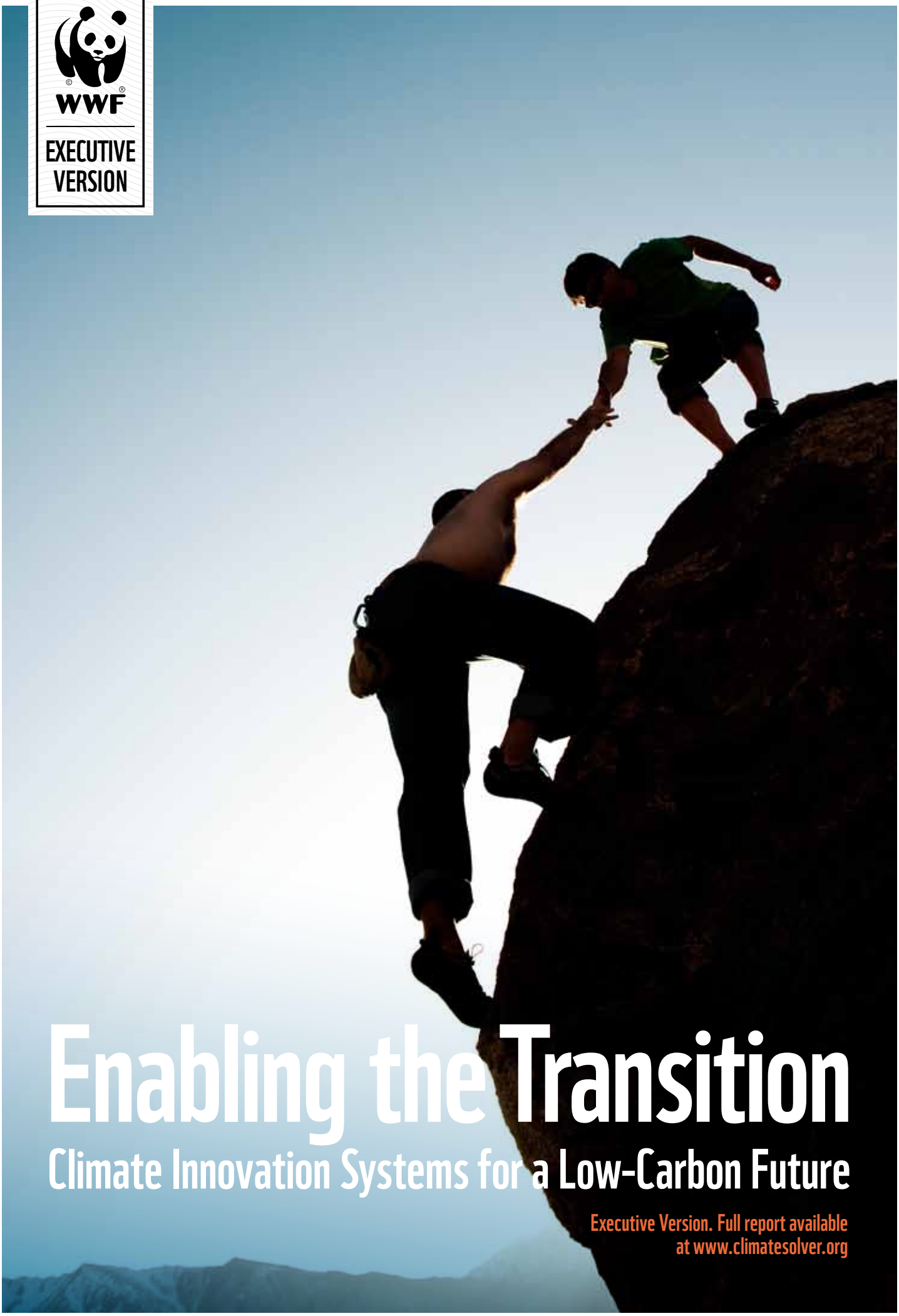

Enabling the Transition

Climate Innovation Systems for a Low-Carbon Future

Executive Version. Full report available at www.climatesolver.org

CONTRIBUTORS

Editor in Chief: Magnus Emfel, WWF

Editor and research: Lotten Kratt , WWF

Innovation system assessments:

Tanzania: Dr. Flower E. Msuya, Western Indian Ocean Marine Science Association and Peter Chisawillo, Tanzania Chamber of Commerce, Industry and Agriculture and Thomas Winther, Innogate

Uganda: Yasin Naku Ziraba and Grace Twinamatsko, Makerere University

Kenya: Kavore Kariuki, KGroup Consultants and Thomas Winther, Innogate

Ghana: Gordon Akon Yamga and George O. Essegbey, Science and Technology Policy Research Institute, and Thomas Winther, Innogate

China: Li Baoshan and Xu Yunsong, China's Renewable Energy Academy, and Lv Fang , Ma Liyun and Wang Jielu, Beijing Jikedian Center

India: Petra Sonderegger, Indian School of Business, Shirish Sinha and Tirthankar Mandal, WWF India

EU: Pernille Schiellerup and Bogdan Atanasiu, Institute for European Environmental Policy

The Netherlands: Ward van den Berg and Arnoud van der Slot, Roland Berger Strategy Consultants

Sweden: Jacob Rutqvist, GlobalFOCUS
Stefan Henningsson, WWF Sweden

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External experts:

Andreas Englund, Innovatum Technology Park
Robbert Droop, Netherlands Ministry of Environment;
Dan Strömberg, University of Gothenburg;
Birte Holst Jørgensen, Technical University of Denmark; Hans Nilsson, Four Fact

WWF staff:

Jason Anderson, Annsofie Aronsson, Jean-Philippe Denruyter, David Duli, Barbara Evaeus, Dongmei CHEN, Stefan Henningsson, Yanli HOU, Tobias Krug, Thomas Otim, Tara Rao, Oliver Rapf, Anna Söderström, Vicki Lee Wallgren, Tao WANG, Mattias de Woul, Chu ZHANG

Copy editing: April Streeter

Format and design: Sven Björnekull

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WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global Network active in more than 100 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by: conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

FOREWORD

On a global average, we consume 50% more than the Earth's annual biocapacity. This overshoot is largely due to greenhouse gas emissions from human activities which are far more than ecosystems can absorb. Our carbon footprint has increased by over 30% since 1998, and now accounts for over half of humanity's Ecological Footprint.

Business-as-usual CO2 emissions will guarantee a catastrophe with global repercussions for the natural systems upon which we depend. Decisive actions are needed now so that emissions peak-and-decline before 2020.

This transition requires new solutions – products, systems and services – with radically reduced climate impact. But, technology isn't the issue. Climate innovations[1] are numerous, proven, and available. The question is how we can employ them at speed and scale, globally?

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On top of a wind turbine blade in expansive Baoding, China.

Innovation systems are vital enablers for the transition to an equitable low- carbon future. They create the eco-systems for explorers of new solutions, and are where they pursue their endeavors. They typically encompass stakeholders, resources and processes necessary for bringing innovations to market that we depend on for our future. Success or failure of an innovation is shaped by the performance of the innovation system.

In this report, summaries of studies for China, India, Tanzania, Kenya, Uganda, Ghana, the European Union, the Netherlands and Sweden are provided as a reality check. Every country and region has its own unique starting point and ability to create enabling environments for climate innovations. However, they also share a great deal of the challenges and the opportunities gained from strengthening climate innovation systems. Referring to our mission - to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature – WWF aims to reach out to key stakeholders and catalyze the improvements needed for a transition to a low-carbon future.

Climate change is a global challenge and must therefore be tackled by people around the globe in the spirit of cooperation, with a perspective that goes beyond protectionism. It is not a contest to be won by any single country or company.

Narrow-minded competition may turn us all into losers. But if we manage to enable the transition successfully, together, everyone will be a winner.

1 In this report climate innovations refers to cleantech, clean energy technologies, low carbon solutions etc. Visit www.climatesolver.org to find example of climate innovations, each of which has the potential to reduce global CO2 emissions by 20 million tons per year in 10 years – if given the right support to grow.

MEETING THE CLIMATE CHALLENGE THROUGH GLOBAL TRANSFORMATION

Numerous scientific papers and policy reports published in recent years stress the fact that the planet cannot afford a continued 'business as usual' pathway.

To avoid devastating consequences, we must keep eventual global warming below 1.5°C compared to pre-industrial temperatures. For this to be possible, global greenhouse gas emissions must start falling within the next five years, and be reduced by at least 80 per cent globally by 2050 (from 1990 levels)[2]. Reducing emissions to such a great extent and pace requires radical action immediately.

What is needed today are decisive actions which would catalyze the peak-and-decline transition, towards a low-carbon economy. A massive deployment of appropriate systems and services that produce low or no greenhouse gas emissions would enable such a transition. The longer the wait to introduce these advanced technologies, the higher and more costly the required emissions reductions will be.[3]

Key messages:

- Business as usual CO_2 emissions will guarantee a catastrophe with global repercussions.
- Climate change is more serious for long-term economic growth than any single financial crisis.
- Decisive actions are needed now to start a peak-and-decline transition before year 2020.
- Technology isn't the issue, renewables can replace fossil fuels globally by 2050.
- Climate innovations are available, political will and market frameworks are lacking.
- Concerted efforts from leaders in policy and business can bring jobs and prosperity.

Enabling sustainable energy solutions

To enable the transition to a low-carbon future it is crucial that we employ the full potential of energy conservation practices. Energy efficiency can be defined as all practices that enable a reduction in the energy used for a service or product.[4] In a business-as-usual scenario the global energy demand will be at least doubled (+100%) in 2050. Energy conservation has the potential to reduce energy demand by 15% by 2050.[5] In fact, energy efficiency constitutes the most time- and cost-effective strategy to reduce CO2 emissions, and it is fundamental for the transition to an energy system with 100% renewables. To date, only a few industrialized countries have established robust energy-efficiency policies and put relevant measures in place.[6]

Since 1850 the primary energy sources exploited to build cities, warm houses, accelerate transportation and fuel the economy in general have been coal, oil and gas – the three most CO2-intense energy sources in the world. These fossil fuels have dominated global energy supplies, presently accounting for more than 80 percent of the primary energy mix.

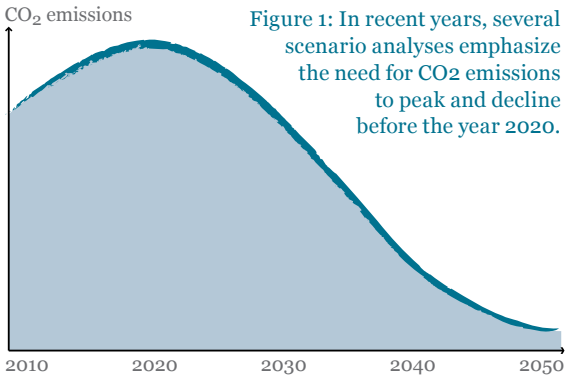

Figure 1: In recent years, several scenario analyses emphasize the need for CO2 emissions to peak and decline before the year 2020.

Today there are several clean alternatives to climate-damaging fossil fuels. Imaginative innovations have allowed humans to develop technologies such as solar cells, wind turbines, electric cars, and biofuels, allowing us to make use of these renewable energy sources. These technologies are crucial to successfully achieve a peak-and-decline of CO2 emissions and to avoide dangerous global warming.[7]

2 WWF (2011).
3 UNDESA (2009).
4 World Energy Council (2008).
5 Ecofys/WWF (2011).
6 UNIDO (2009 B).
7 Roland Berger/WWF Netherlands (2009 A).

Several analyses indicate that renewables could provide almost 100 percent of the global energy demand by 2050.[8] Such a technological transformation is feasible and necessary. The future challenge of supplying energy for 9 billion people, while staying within the boundaries of our planet's resources calls for a variety of solutions – large- and small-scale, centralized and distributed.

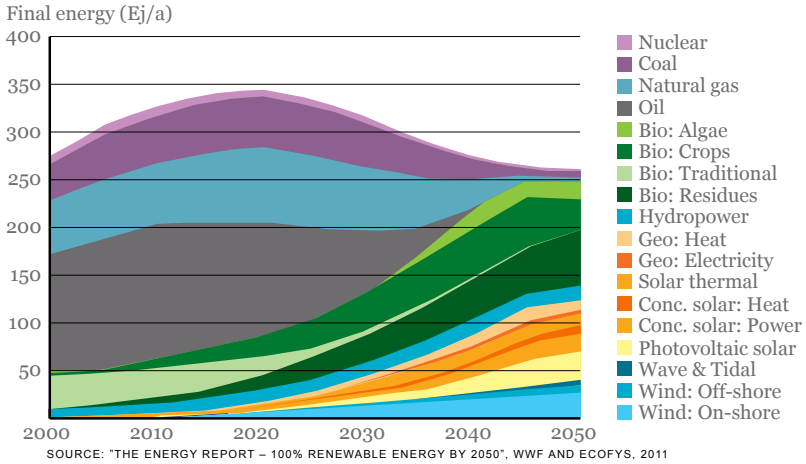

Figure 2: Scenario of climate solutions for a sustainable energy mix by 2050

Most of the climate innovations needed to combat climate change already exist today. Based on the calculations of the development potential of each clean energy source, the total supply of renewables in 2050, could far exceed world energy demand (figure 3) – what is mainly lacking is political will and enabling market frameworks.

Investments in clean energy technologies

According to IEA:s BLUE Map Scenario for achieving 50% CO2 emission reductions by 2050, the additional global investment requirements in renewables and energy efficiency are estimated at US$ 316 trillion, between 2010-2050 which is US$ 46 trillion more than in a Baseline Scenario[9]. However, IEA calculates that the additional investment will yield savings equal to US$ 112 trillion due to energy efficiency and lower fuel prices.

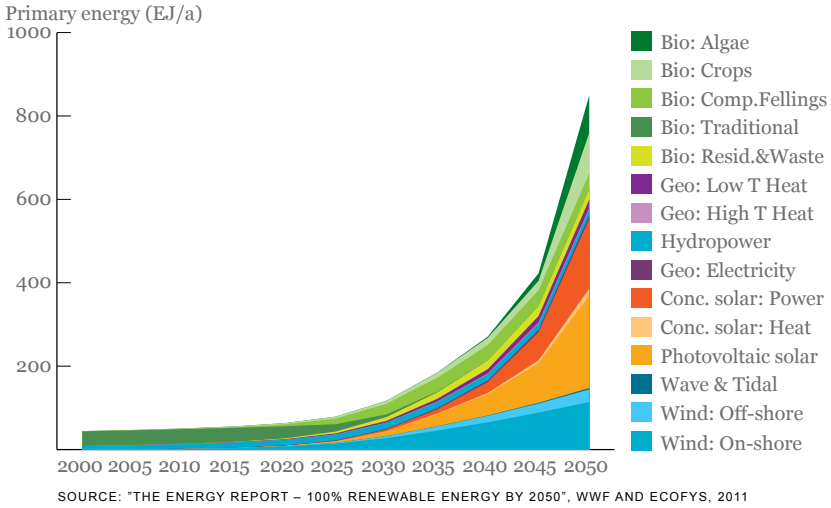

Figure 3: Estimated potential of clean energy solutions

The market alone will not deliver efficient and clean energy in the time and at the scale required to prevent dangerous climate change. As in any new technology field, government investments are necessary to support R&D efforts and commercialization, and to set policy frameworks that facilitate rapid transition to a low-carbon economy. Policy makers need to find ways to attract capital to make the necessary investments in low-carbon solutions.

Besides greening fiscal stimulus packages, clean energy use should be mandated in public procurement, which would create guaranteed markets for leading innovators in transport, heat and electricity."[10] Governments in countries that lack access to reliable energy services, electrification, or renewable fuels, could push forward investments in climate innovations as key measures to reduce poverty, improve health conditions, and increase standards of living.[11]

8 See for example: WWF (2007, 2011) and IEA (2008 B).
9 IEA, (2010). See also Stern Review (2006) or WWF (2010 B).
10 World Economic Forum (2009).
11 UNIDO (2009 A).

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Discussing the anticipated effects of rising sea levels in India.

In the pursuit of making our societies and economic system more climate resilient, there will be need for investments in new solutions (such as retrofitting of houses, expansion of low-carbon infrastructures and smart transportation) for decades to come.[12] Such investments are expected to stimulate a steep future rise in much-needed new employment opportunities offered by the green market sector.

Sharing global burdens and opportunities

Avoiding the unprecedented threats posed by runaway climate change will require concerted efforts in establishing solid international cooperation. All countries have a critical role to play in the much needed joint efforts to curb global warming. Any efforts to totally eliminate emissions exclusively from high-income countries would be far from sufficient for reaching our global emission reduction targets by 2050. Concerted efforts in other parts of the world are vital as well. Industrialized countries cannot do it alone.

In 2010, the UN issued a report which emphasized that access to sustainable energy is an essential condition to the achievement of the Millennium Development Goals and that by 2030 all people should have access to modern forms of energy.[13] A sustainable energy future must be a fair one, in which the fundamental right of every person to benefit from the world's energy resources is recognized. Climate innovations offer the potential to transform the quality of life and improve the economic prospects of billions of people.

Curbing climate change is both a shared responsibility and a mutual opportunity. Without global collaboration, the responsibility cannot be met and the opportunity cannot be realized.

Key messages:

- Innovation systems are a base camp for explorers looking to find solutions that we need for our future.
- Success or failure of an innovation is shaped by the performance of the innovation system.
- Policy frameworks must favor low-carbon technologies and stimulate radically increased investments in them.
- There is a need for policies and incentives tailored to the specific dynamics of climate innovations.
- Without private capital the world will see very few climate innovations on the global market.

The DNA of a climate innovation system

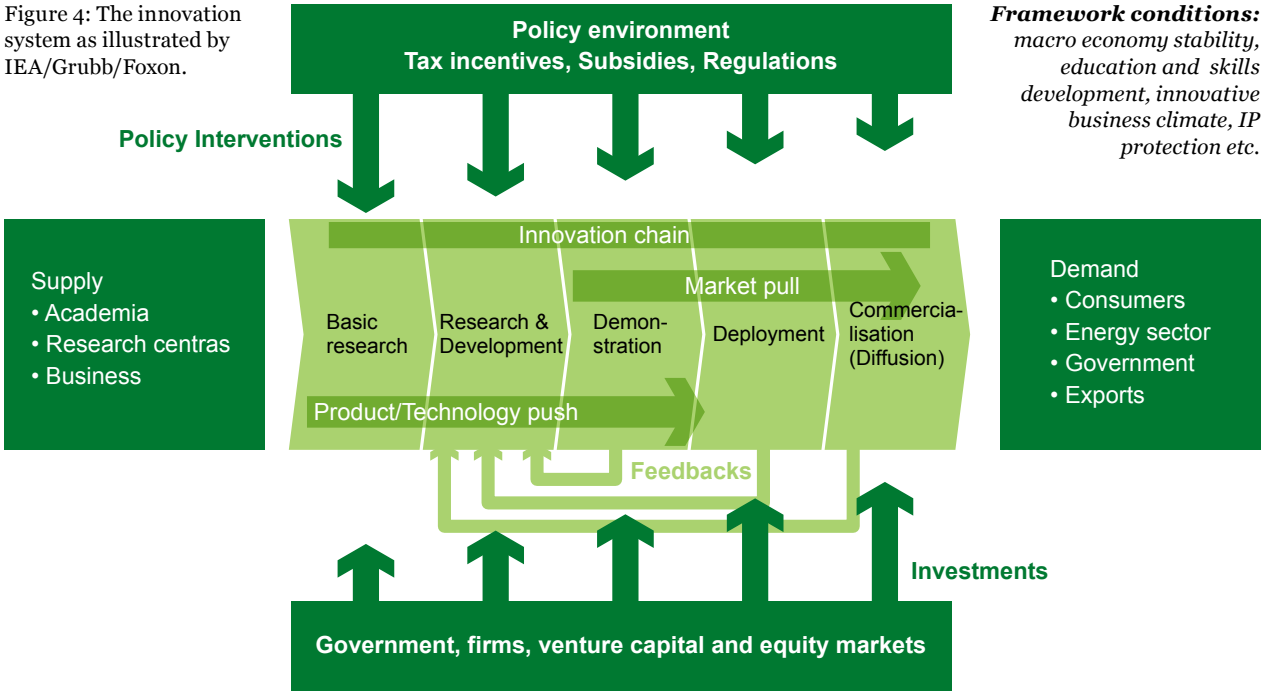
WWF defines a *climate innovation* as a transformative non-fossil and non-nuclear product, service or system that, given favorable conditions, will generate >20 million tons of annual greenhouse gas reductions in ten years when applied at scale. [14]

There is a close relationship between innovations, the innovation process through which they are developed, and the innovation system that provides the framework and resources for these activities. What determines the success or failure of a potential innovation is to a large extent the quality, performance, and available resources in the innovation process, which in turn is shaped by the quality of interplay between stakeholders encompassed by the innovation system.

Innovation is the outcome of a complex system that relies on the individual capacity of a multitude of actors, ranging from governments, universities, and research institutes to businesses, consumers, financial institutions, and non-profits. All the mentioned actors play a unique and crucial role in an *innovation system*, which can be defined as that set of distinct institutions which jointly and individually contribute to the development and diffusion of new products, systems, or services.

12 WWF (2010 A).
13 United Nations (2010).
14 Visit www.climatesolver.org to find example of such climate innovations.

Figure 4: The innovation system as illustrated by IEA/Grubb/Foxon.



The staff of the Bogoria Bank Community financial services office. Lake Bogoria region, Kenya.

The government functions primarily in setting an enabling framework, i.e. designing "rules of the game" through three main sets of policy instruments: public procurement, standards and regulations, and tax incentives/subsidies.[15]

IEA data stresses that funding for clean energy R&D will need to increase to similar volumes in other countries around the world.[16] The Major Economies Forum on Energy and Climate reinforced this message in 2009, stating that investments need to increase 3-6 times for R&D or even more, particularly for commercialization.[17]

Experience shows that the amount of private capital needed for an innovation to become commercially successful on the international market is approximately five times that of public funding. Several expert studies point to the fact that some 80% of the investments in climate innovations need to come from private sources.[18] This indicates that without private investments the world would see very few new solutions on the global market.

Investments in clean energy only account for 10% of global energy infrastructure spending.[19] Accelerating climate innovations means creating an investment framework that results in a low-carbon re-allocation of global assets, attracting investors to the clean energy market.

15 UNDESA (2008).
16 IEA (2008 B).
17 Major Economies Forum (2009 B).
18 For example: UNFCCC (2009) or UNEP/SEFI/Bloomberg (2010).
19 World Economic Forum (2009)

REALITY CHECK: ASSESSING THE CONDITIONS IN NINE CLIMATE INNOVATION SYSTEMS

With the aim to capture the current situation and facilitate improved conditions for climate innovation deployment, the innovation systems in nine economies have been assessed. All studies were commissioned by WWF and completed during 2008-2011.

A selection of key findings are presented here – visit www.climatesolver.org to learn more from the full report and the original assessments.

China

"Analysis of Conditions for Development & Deployment of Innovations for a Low-carbon Economy in China", produced by Chinese Renewable Energy Society and Beijing JKD Renewable Energy Development Center in 2010.

Wind power production site for one of China's 2,100 renewable energy enterprises.

Lack of loans and other financing mechanisms, coupled with relatively backward research infrastructures, are the two common hinders to in the progress of China's low-carbon technology development and innovation. It is clear that there is a great challenge to increase investments in R&D of low-carbon energy technologies in China. Relevant literature in this field shows that in the year 2000, energy R&D investments in China amounted to approximately 6.34% of total R&D investment, accounting for 0.064% of the country's GDP. Government investments were 10.65% of the total energy R&D investment, accounting for 0.068% of the country's GDP, which was much lower than that of most developed countries in the same period. In terms of absolute amounts invested, China is lagging behind the developed countries even more. In short, China faces a great challenge in stimulating increased investments in energy R&D, as current low levels are the fundamental reason for the lack of energy mainstream technology, along with independent intellectual property rights, and the slow development and high cost of low-carbon energy technologies.

India

"Indian innovation system – development and diffusion of low-carbon technologies", produced by Centre for Emerging Market Solutions, Indian School of Business, April 2010.

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Production of jaggery (raw sugar) in Uttar Pradesh, India. The waste material, bagasse, can be used as a source of biomass energy.

Renewable energy standards and other legislation must be properly implemented and enforced if markets are to to function properly. The involvement of several different ministries and agencies in development of policies and regulations, sometimes with conflicting interests, drastically reduces the efficiency and sustainability of the national climate innovation system. These circumstances are confirmed by entrepreneurs and other key stakeholder groups, who stress that Ministry on New and Renewable Energy is implementing many different relevant policies, but that they lack a unifying vision. The current dramatic variations in state policies will eventually become a burden to the deployment of low-carbon technologies. A progression to more uniform policies is recommended. The single most important policy issue affecting entrepreneurs is the reduction of paperwork. True genuine one-stop shop arrangement would improve the access to and the effectiveness of many existing schemes.

The weak co-ordination between the state and national government (especially since nodal agencies are often understaffed and underfunded) coupled with the enormous range of different state policies, is a huge challenge in India today. This leads to high regulatory uncertainty, and presents an obstacle to firms that might otherwise scale their operations faster and across all states.

Kenya

"Climate innovation and entrepreneurship in Kenya", produced by KGroup Consultants and Innogate Aps in 2010.

Government policy-making processes tend to be slow, with key ministries lacking capacity to formulate policy guidance and regulations for low-carbon technology, renewable energy, and climate innovations. Furthermore, neither government ministries nor departments are sufficiently coordinated. Climate innovation and entrepreneurship cut across a number of ministries and departments, including private sector development, agriculture, research, environment and policy development. It is therefore critical to increase government coordination and efficiency in the coming years.

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Improved cook stoves reduce the need for wood fuel by 40 percent in Kenyan homes. Nairobi, Kenya

Tanzania

"Climate innovation and entrepreneurship in Tanzania", produced by West Indian Ocean Marine Science Association (WIOMSA) in August 2009.

PHOTO: © WWF-CANON / JASON RUBENS

Awareness raising and knowledge sharing is important to strengthen the innovation system.

Although most ministries, departments and agencies at government level have sections dealing with environmental issues, there is very little coordination and interaction between these institutions.

Harmonization of policies on climate change, climate innovation, and entrepreneurship requires an environment that promotes the inclusion of government, private sector, and civil society in the policy revision/formulation processes. Such involvement of key actors would be a significant step towards policy frameworks that provide a favorable environment for climate innovation and entrepreneurship.

The key institutions and components comprising the national climate innovations system exist in Tanzania, but they do not reap the benefit of operating as a coherent system with formalized institutional collaboration frameworks. For this reason it is important to develop a platform that enables better linkages and collaboration among key actors.

Uganda

"Climate Innovation and entrepreneurship research," produced by Makerere University, Innovation Systems Cluster Program-Uganda in 2011.

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Drought and flood resistant crops are important for Uganda in adapting to climate change.

Uganda has a great number of climate innovations, both local and foreign and many at the research phase in knowledge institutions. These innovations are related to both mitigation and adaptation to climate change for example, drought-resistant seed and crop varieties, water harvesting, irrigation and energy systems, tree planting, climate change monitoring, energy efficiency, and energy-saving technologies. However there is a real need for better dissemination of the findings, and for transforming innovations into business. The link between business and knowledge institutions thus needs to be strengthened. Due to the technical nature of business this link is very important and can be facilitated by development partners.

Awareness raising, to make people understand the causes and effects of climate change and hence the relevance of climate innovations has been proven to be one of the largest challenges in Uganda.

Ghana

"Report on assessment of climate innovation and entrepreneurship in Ghana", produced by Science and Technology Policy Research Institute (CSIR-STEPRI) July 2009.

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Training, knowledge sharing and access to funding are all required for capacity building in Ghana's innovation system.

Inadequate sources of funding are often identified as a challenge by many of the stakeholders within the national climate innovation system in Ghana. In the private sector, expanding enterprises in the environment and climate sectors require increased access to funding. However, the current level of understanding in existing financial institutions which could provide such funding is too low or fragmented. This mirrors the situation for many knowledge institutions, which face major difficulties in identifying external funding sources to produce prototypes of their innovations. At the same time, government agencies responsible for environment and climate change have difficulties obtaining adequate funds in order to implement mitigation and adaptation programms on climate change and to invest in green development.

European Union

"Innovations for a Low-carbon Economy – An Overview and Assessment of the EU Policy Landscape", produced by the Institute for European Environmental Policy (IEEP) in September 2010.

PHOTO: © EDWARD PARKER / WWF-CANON

Innovations play an important role in EU:s strategy for 2020.

It is clear that EU innovation policy is primarily concerned with technology, and pays relatively little attention to non-technological innovations. This also applies to low-carbon innovations. Furthermore, it is also clear that apart from the Lead Market Initiative, the overwhelming emphasis is on supply-side, with much less attention to the formation of markets, or demand-side policy. There is much more emphasis on the development of innovations than on the deployment of them. Again, the Innovation Union flagship suggests that this can improve in the coming years. Here, the critical issue of access to capital is addressed, but more attention could be paid to the private sector side of the financing coin.

A number of elements are missing from the EU policy landscape for the deployment of low-carbon innovation. However, even if we adopt an inclusive definition, the array of policies currently assembled will not help us achieve our goals by 2050 (i.e. >80% reduction).

There is a clear need for a more ambitious and more fundamentally transformative approach to innovation in the Community if we are to reach our climate change objectives to 2050.

Netherlands

"Clean Economy, Living Planet - Building the Dutch clean energy technology industry", produced by Roland Berger Strategy Consultants, November 2009.

In the Netherlands there is a shortage of capital for clean energy technology. In 2008, in-country investments in clean technology decreased substantially by 34%. Meanwhile, in the rest of Europe they increased by 55%. In the seed phase especially, the Netherlands is far below the European average. Furthermore, Dutch banks invest much more in fossil energy than in clean energy (<6%).

The Netherlands is not able to harvest as much as it should from its knowledge base in cleantech.

Only 1.6% of European PE investments in clean energy technology are in the seed stage, compared to a 4.4% average for all sectors. In the Netherlands, however, these seed-stage investments are almost nonexistent (0.3% of the total, less than EUR 1 million). By comparison, start-up and later-stage venture funds grew by more than 1400% each (to EUR 47 and 92 million, respectively) and expansion funding fell by 87% to EUR 34 million. According to venture capitalists in the Benelux, there is insufficient private equity in the Netherlands to finance both smaller and high risk start-up companies and to fund the expansion phase of larger clean energy technology firms.

PHOTO: © WWF / ROB WEBSTER

Sweden

"12 Climate Entrepreneurs – Revolutionary Innovations for a Carbon-Free Future", produced by Global FOCUS, 2008).

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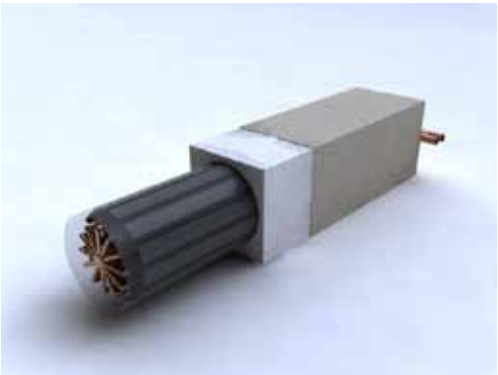

A challenge in attracting investors is that many require involvement of other investors, which can ultimately result in the need to find three or four investors at the simultaneously. Furthermore, the many steps and long processes involved when working with technologies for the public sector is a major obstacle in attracting investors.

Several of the entrepreneurs interviewed find that Swedish venture capitalists lack sufficient knowledge of clean energy technologies. This results in investors shying away from the clean tech market, preferring investments in IT or other sectors that they are more familiar with.

A lot of potential is seen in government regulations and public procurement. Strengthened energy-efficiency standards, increased criteria for innovative technologies and clean energy solutions in public procurement are highly requested government strategies. Other measures asked for are cost reductions such as tax-deductible investments in small clean-tech businesses, simplified application processes for public funds, and reduced demands on high co-financing.

A systems-wide approach is needed for Swedish climate innovations to contribute to a resource-efficient economy domestically and globally.

GLOBAL PERSPECTIVES ON CLIMATE INNOVATION SYSTEMS

Key elements of a high-performing climate innovation system

Similar to the findings of several well-known reports published in recent years in the field of technology development and transfer,[20] the national assessments present a wide spectrum of factors that determine a country's ability to stimulate investments and access to funding for low-carbon innovations and technological change.

The level of awareness of climate change impacts, as well as available mitigation and adaptation solutions at the national level, are both crucial in stimulating much-needed political leadership and government action. The location of relevant policies in respective central and local government structures has an impact on the overall effectiveness and sustainability of the climate innovation system.

Key messages:

- Countries' ability to create enabling environments for climate entrepreneurship varies.
- Policy makers need to geographically harmonize policy environments that: strengthen market conditions, address IPR concerns, promote knowledge sharing, leverage infrastructure investments, and involve civil society.
- Any progress or output is the result of a collaborative stakeholder exercise, nationally as well as internationally.
- Investors value government policy-making that signals intent and consistency.

The clean technology sector is characterized by serious risks that call for active management in a number of areas, while climate change presents risks that cannot be addressed with incremental improvements alone. Criteria used in the innovation systems should reward radical breakthrough solutions. However the current situation tends to be the opposite, i.e. transformative solutions have more difficulties in attracting support from investors and other key stakeholders – a policy lock-in that must be resolved.

Public funding as well as progressive subsidies and tax systems can help fill the gaps in critical stages of technology commercialization. Governments can also promote balanced risk-taking by investors, entrepreneurs, and corporations by: providing guarantees and risk-sharing schemes; ensuring unhindered information flows; and making favorable insurance options and other market mechanisms available.

The need for improved IPR systems has been stressed in several of the national assessments. Further development of both the IPR system and IPR-free models are needed to eliminate barriers in the transition to a low-carbon future. The strength of the legal system is to a large degree dependent on the government's capacity to ensure compliance with adopted standards and legislation.

The world is currently experiencing a massive urbanisation trend. Given the estimated $350 trillion that will be spent on urban infrastructure and use over the next three decades, it is essential that these investments are allocated in such a way that urbanization contributes directly to the low-carbon transition. [21]

Increase collaboration, coordination & networking

The strength of a national climate innovation system is only measured by its weakest element. The specific capacities and comparative advantages of government agencies, R&D institutions, and the private sector actors must be coordinated to capitalize on inherent synergies. Action in isolation is bound to fail. Cooperation is key.

Similar to domestic cooperation, mulitlateral collaboration between governments, research centers, and the private sector can achieve scale and build international markets for new innovations and help drive economic growth in all countries involved. In a global market the deployment costs can be substantially reduced through economies

20 See for example UNDESA (2008) and IPCC (2000).
21 WWF (2010 E).

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Global collaboration can make everyone a winner in the fight against climate change.

of scale. One of the most effective ways to improve the performance of climate innovation systems is to increase international cooperation. Partnerships established among corporations in OECD and non-OECD countries have proven to be very effective in developing and transferring technologies. [22]

Clean energy policy for accelerated investments

Financial institutions need to recognize that longer term financial stability rests on building overall climate resilience in all the various sectors and segments of the population. Governments, knowledge institutions and civil society organizations need to influence the allocation of financial investment for longer term development and stability for all.

Given the critical role government involvement plays in climate innovations, governments need to be able to decide which set of policy instruments to use to ensure sufficient levels of investments. These policies and measures should combine substantially reduced emissions in the short and long term, generate substantial investments from the private sector, create jobs in the market and be possible to implement in most countries.

As an example, effective measures for energy efficiency in the building sector have been implemented in Germany through a package of policy measures for energy-efficient buildings. For every EUR provided in the financial support schemes for efficient renovation in 2009 and 2010, another 9 to 12 EUR were invested in building retrofits. The success factor for the energy-efficient buildings program has been the combination of efficiency obligations, prefinancing, information campaigns and additional capacity building integrated in a coherent package.

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Private investors prefer policies that stimulate market demand before measures for technology push.

Another example presents a survey of venture capitalists' preferences for public policies to stimulate renewables.[23] The market-pull policy instruments for renewable energy investments received on average higher scores than the technology-push regulations assessed above. This indicates that, contrary to governments' tendencies to focus on influencing technology-push measures on innovation, the investors prefer a market-pull approach for renewable energy. In addition, traditionally-favored policy options such as renewable portfolio standards and tradable renewable certificates were seen as some of the least-effective instruments according to this survey. Confirming the findings of previous reports,[24] the fund managers in the survey attributed the highest score to the effective role of feed-in tariffs.

Enabling the Transition and the original assessments show that there is a range of elements – including public and private actors, research institutions, and civil society – that determine the performance of a climate innovation system. By making sure that the key stakeholders, resources, and processes of a national climate innovation system are in place, governments have the opportunity to enable the transition a low-carbon future.

22 UNDESA (2008).
23 Bürer, Mary et. al. (2009).
24 IEA (2008 A).

Checklist for high-performing climate innovation systems

- Ensure that basic environmental legal and regulatory systems are in place – including an efficient and widely accepted approach for intellectual property rights.
    - Focus a significant portion of economic stimulus packages and infrastructure investments on development and use of low-carbon technologies and energy efficiency as a method to accelerate both prosperity and global emissions reductions.
- Explore and implement the most efficient policy vehicles (e.g. energy-efficiency standards, feed-in tariffs and tax incentives) as a key government contribution towards accelerated domestic and foreign direct investments in climate innovations.
    - Institutionalize support for climate innovations by ensuring government ownership and accountability through a dedicated ministry or agency with a central role in national planning. Mandate this body to coordinate cross-sector public engagements, sufficient capacity-building and to drive a nationwide technology shift towards climate innovations in housing, transport, industry and agriculture.
- Make sure that standards and targets for energy efficiency and clean energy are set high and favor transformative solutions in public and private procurement, thereby stimulating market demand for climate innovations.
    - Increase transparency and accountability around policy-making on climate innovations, through increased outreach and involvement of civil society organizations and private sector in national dialogue and decision-making.
- Enable stronger support for technology demonstration and market deployment in order to facilitate the survival of climate innovations through the so called 'Valley of Death.'
    - Establish a national platform that facilitates increased awareness of current climate impact and existing solutions, and the collaboration among climate innovation stakeholders. Through this platform, engage in international cooperation to exchange experiences and best practices, and employ climate innovation policies and tools from all over the world.
- Foster and strengthen a collaborative attitude among all stakeholders in the climate innovation system so that more climate technologies are able to serve the global markets.
    - Expand the opportunities for climate entrepreneurs to receive one-stop support from facilitators like business incubators. Reduce administration required for grants, demonstration support and commercialization by encouraging more entrepreneurial policy practices.

Enabling the Transition

Climate Innovation Systems for a Low-Carbon Future

Executive Version. Full report available at www.climatesolver.org

FSC MIXED SOURCES

ASSESSMENTS

Summary of nine studies: China, India, Kenya, Tanzania, Uganda, European Union, The Netherlands, Sweden.

INNOVATION SYSTEMS

The ecosystem for entrepreneurs; key stakeholders, resources and processes; capacity building for improved performance.

POLICY

Enabling frameworks; harmonized, long-term legislation; ambitious targets; stimulate demand; reduce risk; access to capital.

TECHNOLOGY

... isn't the issue; create momentum for proven solutions; attract capital for global deployment at speed and scale.

INVESTMENTS

Universal lack of access to capital; increase at least fivefold; majority to come from private capital; attract investors to climate innovations.

COLLABORATION

Awareness raising and interaction; establish local and global platforms; concerted efforts can make everyone a winner.

WWF

Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

www.climatesolver.org

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