BRIEFING PAPER

The Race to Low-Carbon Economies has Started

Developing Countries Leading Low-Carbon Development

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GERMANWATCH

Brief Summary

Although international climate negotiations have made little progress since the largely failed talks of Copenhagen in 2009, especially developing countries have started the race towards low-carbon development. Low-Carbon Development Plans (LCDPs) have been developed that describe goals and measures of the respective nation's climate change efforts and lay a foundation for overall development planning.

This paper describes indicators that help to analyze the progressiveness of such LCDPs. With the help of these indicators three representative LCDPs are portrayed in more detail. These countries are: Costa Rica, being among the most ambitious countries with a goal to reshape its economy and society to a carbon neutral one already by 2021, China as the most relevant country when it comes to mitigating global climate change, and Bangladesh as being one of the most vulnerable countries.

These promising examples, if seen in the context of global coalitions, are extraordinarily constructive input for the United Nation's climate change negotiations. They can help to create the momentum that is desperately needed to finally agree to a fair, ambitious and legally binding international treaty in the future. It is therefore vital to recognize these efforts and to develop new and enhance existing means of cooperation to amplify the positive dynamics that these developments have.

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DEVELOPING COUNTRIES LEADING LOW-CARBON DEVELOPMENT

Lukas Hermwille

Contents

1 Introduction

After the Copenhagen Climate Summit in December 2009 public attention of the threats of global warming has somewhat decreased in Germany as well as in most other industrialized countries. However, the threat itself has not vanished. To the opposite, recent scientific findings suggest that the level of urgency has not changed. To support this, global temperature data shows that 2010 has globally been the hottest year on record.[1] Therefore, it is essential that efforts to mitigate climate change must be accelerated on all levels.

Many expected the United Nations Framework Convention on Climate Change (UNFCCC) conference in Copenhagen to start a global race towards low-carbon economies. However, the starter's gun did not fire. Most developed countries including the United States and large parts of the European Union remained in a nearly paralytic state, blaming China and other major developing countries for the withdrawn start. One year later, the Cancún talks have reanimated the United Nation's climate change negotiations process to some degree. Nevertheless, aggregate climate change mitigation commitments are still far apart from a level of ambition that effectively creates a realistic chance of limiting global warming to maximally 2°C or possibly even below.

With the Cancún Agreements, developing nations are for the first time officially encouraged to develop low-carbon development strategies or plans. Yet, many developing countries seem to have already begun this process. They started the race without a starting signal and without developed countries noticing. As of 2007 a series of developing countries have announced strategic plans to combat climate change within their borders. Of course, national circumstances differ widely and so do the announced strategies. The efforts differ from integral development plans to mere announcements of long-term goals. The level of ambition differs from only slight deviation from business as usual to plans for becoming carbon-free by 2020, as is the case for the Maldives.

This paper aims to characterize a vanguard low-carbon development strategy and to identify examples of such. Furthermore, it is the goal to analyze the role that these kinds of national initiatives can play - in particular for the negotiations under the UNFCCC and for international cooperation in general.

[1] National Oceanic and Atmospheric Administration (NOAA) of the United States of America, 2011

One Concept, Different Names – Defining Low-Carbon Development Plans

The idea of comprehensive development plans for mitigation as well as for adapting to the adverse effects of climate change has been given a variety of different names: The European Union has called it “Low-Carbon Development Strategy” (LCDS) in their Submissions to the UNFCCC. Others speak of “Low-Carbon Action Plans” (LCAP) or “Low-Carbon Growth Plans” (LCGP).

At the UN climate negotiations in the Bali Action Plan the term “Nationally Appropriate Mitigation Actions” (NAMAs) was created. It describes all sorts of projects, policies and measures by developing countries to mitigate climate change - whether financially or technically supported by developed nations or not. Therefore, this concept could also be called NAMA-Plan, since it would compile and structure the proposed mitigation efforts of any given country. However, this definition is only limited to mitigation and does not take adaptation measures into account.

In this paper we will use the somewhat broader definition of “Low-Carbon Development Plans” with reference to the definition of Project Catalyst, an initiative of the Climate Works Foundation and the European Climate Foundation: A “Low-Carbon Development Plan” is a strategic plan to assist the country in shifting its development path to achieving a low carbon and climate resilient economy and sustainable development. It is based on the socio-economic and development priorities of the country. It has a long-term component that includes a strategic vision as well as a short- and medium-term component that shows which specific actions will be undertaken to get on a low carbon climate resilient pathway.

2 The forefront of low-carbon development

With climate change ranking as high on the political agenda as it did the last couple of years, many developing countries have started incorporating the issue into their national policies. The degree of climate change mitigation and adaptation being mainstreamed into all different sorts of policy branches varies widely. So far only a hand full of countries has announced integrated Low-carbon development plans. Even within this group of countries there exist variations in the level of importance conceded to the issue. The structures within the institutional framework of the respective countries can serve as indicators for this relative importance. To which institutions do the committees or commissions in charge of the development of LCDPs belong? For the existing efforts it generally holds that the issue is incorporated fairly high in the political hierarchy of the respective countries. Ranging from councils under direct administration of Heads of States (e.g. Guyana, India) to environmental Ministries (e.g. South Africa, Bangladesh) to the National Development and Reform Commission (NDRC) in China. Another indicator for the degree of mainstreaming is the extent to which the efforts undertaken by the government are supported by media, businesses and civil society. Is low-carbon development planning limited to political elites or is it discussed in a broader context by a wide range of actors of different sectors of the society?

Climate change is an international issue that requires bold and concerted measures. On the international level, where an international framework for financing and supporting as well as coordinating mitigation and adaptation strategies in developing countries ought to be developed, progress is painfully slow. For the first time the Cancún Agreements established a process to work out guidelines for the progress of low-carbon development strategies or plans. Furthermore, the Conference of the Parties decided to particularly support Least Developed Countries (LDC) with the development of adaptation plans. However, with the process of developing guidelines and coordinating mechanisms ahead of us, it is important to ensure international exchange to learn from each other’s experiences and to ideally harmonize LCDPs structurally. Such coordinated efforts could provide valuable input to the UNFCCC negotiating process. Not only cooperation between developing nations but also cooperation with developed nations to explore innovative financing and support mechanisms add to this.

Furthermore, the existence of specific needs based development plans is an essential prerequisite for official development funding from developed countries to be allocated. LCDPs - if implemented with the necessary national framework conditions - can improve planning reliability and security for private sector investments. Usually the framework conditions will be more ambitious depending on the amount of co-financing money and internationally provided risk reduction instruments. International cooperation is therefore a vital component for their implementation.

Developing low-carbon economies is an extraordinarily demanding task. This is true even for developed nations. To date, there exist no proven examples of industrialized societies that generate an amount of welfare comparable to current European or US- standards by low-carbon means. Such an economy should generate its welfare staying within the atmospheric boundary set by a fair distribution of greenhouse gas emissions that remain when limiting global warming substantially below 2°C at the end of this century.

Recent scientific research suggests that already in 2050 with a projected global population of around 9 billion people, per capita emissions must stay below roughly 1.5 tons of CO_2 per annum. To reach that goal developed nations must design a completely new model of a prosperous and at the same time sustainable society.

For low-carbon development planning in developing countries the physical requirements for limiting global warming to as far below 2°C as possible demand that development does not merely copy the development paths of today's industrialized countries, but leapfrog to the most sustainable and most efficient of today's technologies. In many cases, leapfrogging can even be a valuable advantage for developing countries, as it can keep them from the economic and political difficulties that deep structural changes frequently impose to societies that undergo them. While from the point of burden sharing it seems unfair for developing countries to demand a leapfrog, it could actually be an advantage for them in the low carbon race towards the future from the point of opportunity sharing.

LCDPs, therefore, should not take today's developed nations lifestyle as a model but rather allow for truly transformative development towards an unprecedented model of prosperous living, which is compatible with the boundaries that climate change imposes. An indicator for this aspect of LCDPs could be to what extent the plans involve capacity building in technological, educational as well as administrative terms. With the right institutions in place future efforts and innovative approaches could root in a much more fertile ground and thereby be established faster and more efficiently.

At present, the requirements for LCDPs of developing countries do not have to comply with the highest standards of ensuring a trajectory that effectively limits global warming significantly below 2°C under the condition of fair burden sharing. However, in the face of the uncertain short-term development of many developing countries it would be too demanding and sometimes even shortsighted to develop and enshrine long-term plans that could comply with these highest standards. Especially in poorer developing countries LCDPs should rather enable than ensure a trajectory to reach this goal. At this stage the important role that LCDPs can and must play is to create dynamics and to kick-start low-carbon, carbon resilient development nationally and internationally. Of course - as soon as international financial support is received – promises have to be fulfilled.

So far, most of the official LCDPs have already been published some years ago. To assess the low-carbon development performance it is therefore vital to examine the progress of implementation of the plans. Although most of the LCDPs concentrate on long-term development, many aspects can be implemented promptly. To support immediate activities and where applicable the implementation of such plans, developed countries agreed in Copenhagen (December 2009) and reaffirmed in Cancún (December 2010) to provide developing countries with 30 billion US$ of "Fast-Start Finance" until the end of 2012. In the past, developing countries have repeatedly been asked to compile detailed plans for different aspects of development. Often, however, developed countries refused to support the implementation of the plans. The progress of implementation is therefore not only an indicator for how seriously developing countries are about combating climate change, but also how seriously developed countries are willing to support them in their efforts.

3 Different countries, different approaches

The state of development and the national circumstances within the group of countries that were defined as developing countries by the UNFCCC varies widely. Therefore, strategies to approach low-carbon development must differ respectively. In the following we depict three examples of LCDPs from countries that somewhat represent the extremes of the wide spectrum of developing nations.

3.1 The vanguard of climate protection

Some of the most progressive climate change mitigation pledges come from developing countries. Climate Action Tracker, an independent science-based project that assesses commitment and action pledges currently rates only two countries as "role models". These are the Maldives and Costa Rica.[2] These two countries have already announced plans to become carbon neutral by 2020 (the Maldives) and 2021 (Costa Rica) respectively and have submitted these pledges to be inscribed in the appendix of the Copenhagen Accord. By accepting such a demanding challenge, these countries have put themselves on the forefront of climate protection and set an example for developing and developed countries alike.

In the following, one example – Costa Rica – will be presented in more detail. Unfortunately, for the second example of the Maledives little information is publicly available.

3.1.1 The LGCP of Costa Rica

The preconditions for a carbon neutral economy in Costa Rica are relatively favorable. Costa Rica already produces 90 percent of its electricity from renewable sources and the country possesses vast forested areas that potentially can sequestrate a large amount of CO_2. Despite these favorable conditions to reach the goal of carbon-neutrality requires a huge effort of Costa Rica.

Costa Rica has set up two separate but closely interlinked strategies to reach that goal: a national and an international agenda. The national agenda focuses on mitigation and adaptation to climate change.[3] However, it also includes somewhat auxiliary agenda items like individual roadmaps for capacity building, financing, education and a reliable measurement and information system. The main components of the mitigation strategy are:

- Increasing the effectiveness of carbon sinks: Costa Rica already has set up a mechanism that has effectively reduced deforestation in the country. In 1997 it established an incentive scheme for Payments of Ecosystem Services (PES). Since then, Costa Rica pays $45-$163 per hectare for forest conservation,

[2] http://www.climateactiontracker.org/ in December 2010
[3] The Climate Change Strategy is divided in two core areas. This paper focuses on mitigation and therefore does not analyze the adaptation chapter.

planting and agro-forestry measures. The money comes from first, the public hydroelectric power company second, the World Bank and third, a 15 percent surcharge on petrol. Additionally Costa Rica has implemented the massive program “A que sembrás un árbol” (plant-a-tree) to increase the forested area of Costa Rica.

- Emission reductions in the transport sector: Almost 75 percent of Costa Rica’s energy-related greenhouse gas (GHG) emissions origin in the transportation sector. Costa Rica therefore aims especially to improve the attractiveness of public transport and to increase efficiency of the vehicle fleet.
- Reducing emissions from the agricultural sector: Methane and nitrogen dioxide, which predominantly source in cattle farming and the production of fodder crops like soya. Costa Rica aims to reduce emissions by optimizing breads and manage manure more effectively.
- Industrial sector: GHG emissions shall be tackled by improved energy efficiency. One proposed measure includes a certification model for environmentally friendly processes to improve market competitiveness of such products.
- Waste management: Methane from landfills and wastewater facilities shall be used to generate clean energy.
- Tourism: Costa Rica aims to further expand eco-tourism in the country.
- Additional to these measures Costa Rica wants to make use of carbon markets to further complement and intensify the efforts. However, Costa Rica does not only focus on voluntary and official carbon markets (i.e. Clean Development Mechanism under the UNFCCC), but also plans to introduce a brand dedicated to promote carbon neutral products on local markets.

The international agenda aims to anchor the Costa Rican model in the international climate change diplomacy arena. Costa Rica intends to increase the credibility of their politics by playing an active and constructive role in the negotiations and by this means to attract financial resources to finance their actions and to influence the development of collective actions to stabilize the climate and thereby reduce vulnerability.

In Costa Rica climate change and low-carbon development planning has gained a high rank on the agendas. The goal of carbon-neutrality in 2021 is widely recognized in all areas of society and economy. The Costa Rican government has quite successfully communicated the chances that come with the development towards a carbon-neutral economy. The National Strategy on Climate Change lines out the goals and challenges of mitigation in Costa Rica quite clearly. However, it remains vague regarding the instruments to reach that goal. Therefore it is hardly possible to judge the state of implementation and the effectiveness of the proposed measures at this stage. An Action Plan of the National Climate Change Strategy that lays out more concrete measures and thus allows more detailed analysis is still under development. All in all the implementation seems not to keep pace with initial expectations from government and civil society organizations alike. Furthermore, high costs associated with extreme weather events in the country have placed a burden on public finances. Hence, the focus of short-term implementation has shifted somewhat towards the urgent adaptation needs.

3.2 The most relevant countries for mitigating climate change

In recent years CO_2 emissions in developing countries have risen with an enormous pace reaching or even surpassing the levels of aggregated developed countries emissions. Although developed countries bear a much larger responsibility in terms of historic emissions, chances to limit global warming substantially below 2°C are essentially zero without bold mitigation actions in newly industrialized and emerging economies. Due to the small historic responsibility and the limited economic and technological capabilities it is essential that these efforts – as long as capability is missing – are to be supported by any appropriate means by developed countries, weather financially, technologically or through extensive capacity building.

Fortunately all of the major emitters among developing countries have already proposed integral LCDPs. The list includes Brazil, China, India, Indonesia, Mexico, South Africa and South Korea. Given the impressive growth patterns, in these countries it is particularly important that LCDPs concentrate on mitigation. In this regard development planning should address the rapidly growing energy demand by meeting this demand more and more by renewable energies and counterbalancing this by sharp improvements in energy efficiency.

3.2.1 China's far-reaching national climate change policy

One of the most far-reaching examples of these countries is probably China. Already in 2007 China announced its National Climate Change Program to support the 11th and 12th Five-Year Plans. This strategic program was complemented in October 2008 by a white paper on "China's Policies and Actions for Addressing Climate Change".[4]

The main goal of the Chinese LCDP is "to build a resource-conserving and environmentally friendly society"[5]. The LCDP is based on an analysis of China's national circumstances and on the impacts of climate change on China. It includes chapters on mitigation, adaptation, the increase of public awareness, international cooperation and the development of institutions and mechanisms.

The timeline for mitigation targets expired already with the 11th Five-Year Plan at the end of 2010. In the field of mitigation it includes plans to shift the economic structure towards a stronger share of Gross Domestic Product (GDP) the service industry and to expand the high-tech industry. Furthermore, China has introduced binding targets for 2010 to reduce the energy consumption per GDP-unit by 20 percent compared to 2005. In addition, the reduction of carbon dioxide emissions per unit of GDP until 2010 by 40-45 percent from 2005 levels was announced. The most recent commitments embodied in the 12th Five-Year Plan are those to reduce energy consumption per unit of GDP by 16 percent, and to reduce the carbon dioxide emissions for each unit of GDP by 17 percent in the period of 2011 to 2015 on the basis of 2010 levels.[6]

[4] Information Office of the State Council of the People's Republic of China: *China's Policies and Actions for Adressing Climate Change*; Beijing, 2008
[5] Information Office of the State Council of the People's Republic of China: *China's Policies and Actions for Adressing Climate Change*; p. 2; Beijing, 2008
[6] The 12th Five Year Targets are currently under review of the Chinese National People's Congress (NPC) and the National Committee of the Chinese People's Political Consultative Conference (CPPCC). See http://www.ccchina.gov.cn/en/NewsInfo.asp?NewsId=27352 accessed as of 9 March 2011

To reach these goals China has planned to limit the growth of highly energy-intensive industries and to accelerate the phase out of backward production capacities in electricity production, mining, iron and steel production and cement industry by constantly increasing energy efficiency standards. For example, China is putting an overall energy consumption cap of 4 billion tons of coal equivalence (TCE) by 2015 in its 12th Five-Year Plan in order to reduce the country's energy dependence on coal, and in the meantime to increase the alternative energy sources. According to data released by the Chinese government China's energy use rose by 5.9 percent in 2010, and reached 3.25 billion TCE.[7]

In addition, China has conducted energy efficiency projects in some sectors. Examples are energy-conserving retrofits of some 150 million square meters of floor space in public buildings, the distribution of some 150 million energy-saving light bulbs and the implementation of compulsory energy-efficiency standards for the 22 most energy intensive products and a number of end-use equipments especially in industry. Apparently China has made significant progress in reaching its national goals. By June 2009 China had already increased energy efficiency per unit GDP by 13.1 percent and has continued its policy.[8] Recently, shortages of diesel oil supplies have occurred in southern China, because local governments had cut off power supplies for factories that did not comply with energy standards. The factories, however, tried to avoid a halt of production by using diesel generators.[9] This episode documents how vigorously Chinese authorities are pushing to comply with their targets.

For renewable energy China has announced a goal to provide 15 percent of all primary energy from non-fossil-fuel sources by 2020. In 2005 China introduced a renewable energy law that was revised in 2009. It requires electric utilities to purchase all renewably generated electricity and establishes a variety of subsidy mechanisms including a fixed feed-in tariff for some renewable energy sources. The law and its associated incentive structure is an excellent basis for the development, demonstration and diffusion of renewable energy technologies and generation concepts. Yet, there are still some gaps in the implementation guidelines in the Renewable Energy Law that haven't been fully addressed. They could hamper a sustainable extension of renewable energies and electricity grid infrastructures in the future.

China also pursues plans to promote grid infrastructure to abate bottlenecks particularly in transmission of wind energy. The renewable energy policies of China have been very successful so far. Chinese wind power generation capacities have increased thirty-fold between 2005 and 2009, matching Germany as the second-largest wind energy producer after the United States of America. China is also leading in the field of solar water heating with installed capacities of 145 million square meters, enough for some 60 million households.[10]

China's low-carbon development strategy also includes measures to reduce emissions from waste treatment by promoting a "circular economy", to control greenhouse gas emissions in the agricultural sector and to promote tree-planting and afforestation

[7] http://www.ccchina.gov.cn/en/NewsInfo.asp?NewsId=27385
[8] UNDP: *China Human Development Report 2009/10 – China and a Sustainable Future: Towards a Low Carbon Economy and Society*; 2010
[9] Spiegel Online: *China dreht Schmutz-Fabriken den Strom ab*; August 16th 2010 on http://www.spiegel-online.de
[10] Martinot, Eric and Junfeng, Li: *Renewable Energy Policy Update For China*; July 21st 2010 on http://www.renewableenergyworld.com

projects. China has also included plans to increase research and development (R&D) efforts in response to climate change. The public funding for R&D on energy conservation and emission reduction has been increased from 2.5 billion Yuan during the 10th Five-Year Plan to 7 billion Yuan (approx. 770 million €) in the current plan.

For the first time, climate change has been positioned in a focused chapter in the new Chinese Five-Year Plan. It is apparent that China has integrated climate change into its development planning. China specifically promotes green and low carbon industries such as alternative energies, alternative-fuel cars, energy saving and environmental protection and others. It aims to increase the contribution of these industries to 15 percent of GDP in 2020. At the same time government officials have announced to cap total energy consumption already in 2015.[11]

During the preparation of the 12th Five-Year Plan, Chinese authorities have indicated in several aspects that they are continuing on their path of low-carbon development. For example, current drafts for deployment of renewable energies expand the projected renewable power capacity for 2020 from 362 GW under 2007 plans to 500 GW (of a projected total capacity of 1600 GW in 2020).[12] Additionally Chinese government officials have announced: "consensus that a domestic carbon-trading scheme is essential was reached" and that domestic carbon-trading schemes will be implemented in the course of the 12th Five-Year Plan in some regions or some energy intensive sectors explicitly naming coal-fired power generation as potential candidate.[13]

On low carbon development, the National Development and Reform Commission (NDRC) has requested pioneer provinces and cities to carry out low-carbon pilot projects in their respective 12th Five-Year Plan at local level. This high profile piloting program is called 'Wu Sheng Ba Shi' (five provinces and eight cities), which is meant to explore a development path suitable for China's low carbon economy.[14]

With regards to institutional development China has made some progress, but still lags behind in many aspects. In 2007 a Leading Committee to Address Climate Change under the chairmanship of the Chinese Prime Minister Wen Jiabao was set up. In 2008 a dedicated department to organize and coordinate climate change related work was created under the NDRC. Furthermore, all regions and ministries were required to build and improve management systems and special institutions on climate change. However, the China Human Development Report 2009/10 by United Nations Development Programme China (UNDP China) states that the decentralized governing structure currently creates structural problems, as the central government's interest may be perceived as conflicting with regional/local development interests.[15]

Local governments are currently in charge of the implementation of legislation issued by the central government. To improve this implementation the Chinese government has introduced new criteria to assess the work of local governments. Besides GDP-growth, energy savings and pollution reduction have become important criteria. However, as

[11] Zhang Guobao cited by WRI ChinaFAQs: http://www.chinafaqs.org/blog-posts/five-year-plan-update-china-announces-total-energy-target
[12] Martinot, Eric and Junfeng, Li: *Renewable Energy Policy Update For China*; July 21st 2010 on http://www.renewableenergyworld.com
[13] ChinaDaily: *Carbon trading in pipeline*; July 22nd 2010 on http://www.chinadaily.com.cn
[14] The five provinces are Guangdong, Liaoning, Hubei, Shaanxi, and Yunan. And the eight cities are Tianjin, Chongqing, Shenzhen, Xiamen, Hangzhou, Nanchang, Guiyang and Baoding
[15] UNDP: *China Human Development Report 2009/10 – China and a Sustainable Future: Towards a Low Carbon Society and Economy*; Beijing 2009

enforcement and monitoring mechanisms are not working properly, implementation of policies is often lax, depending on the region. Moreover, local authorities often lack capacities to apply the detailed rules, for example in the context of the renewable energy law. All in all, the institutional framework of implementing national policies still lags behind and presents an obstacle to trimming economic development even faster to a low-carbon style.

China has actively played a part in many different international dialogues regarding climate change in both the political and the scientific arena. China maintains close cooperation with many developed countries including the European Union as a whole, individually with some member states such as Germany and UK, and the United States of America. In the context of the UNFCCC China has repeatedly stated, that they are not going to solicit extensive financial support but depend on transfer of climate friendly and energy efficient technologies to accelerate their low-carbon development and capacity building. Despite their strong national efforts, China has been hesitant to commit to comparable efforts internationally, which lead to major discontent among developed countries. In Cancún China finally agreed to have their national reports reviewed by international experts and by that cleared the way for an international verification framework.

The Chinese low-carbon development efforts are truly progressive in many aspects. Climate change has been introduced to the mainstream of development planning and the Chinese society is already changing in many aspects. In some sectors, be it renewable energy or transportation, China is already on the forefront of low-carbon development. However, some reasons for critique remain. On sub-national level, institutions, particularly local governments, have to be strengthened and administrative capacity has to build up more rapidly to implement national policies. The second major bone of contention remains international cooperation. On the one hand it is understandable that China does not want to take a leading role in the international climate negotiations as long as the US does not substantially move. On the other hand China could play a much more constructive role in international climate negotiations, if it matched their international commitments with their national ambitions. Some experts expect that in the future the Chinese Government will take the lead in UN negotiations - as soon as the own industry is ready to play the leading role in the international low-carbon race.

Being the largest single emitter, the Chinese mitigation efforts must also be measured against compatibility with enabling a halt of global warming below 2°C. At this point in time, taking the still relatively low per capita emissions, China cannot (yet) be measured with this yardstick. The current plans are certainly not comprehensive enough to fully compensate for increasing emissions associated with the outstanding economic growth that China is experiencing. As a consequence of the exceptional growth, growing energy demand has not only spurred development of renewable energies but also lead to increased consumption particularly of coal. However, the Chinese LCDPs have managed to give China a strong impetus in the desired direction and is certainly an effective tool to create an even more dynamic environment for innovation and progress towards a low-carbon future. It becomes visible that energy security and emission related health reasons together with climate change create strong drivers for the Chinese government to move forward.

Research displays the huge potential of China to expand the renewable energy supply; even though renewable energies currently make up only a limited part on the overall energy mix. China’s renewable energy sector is rapidly growing. Only some years ago,

the People's Republic was only a leading country with regards to the exploitation of big hydropower. But now it is already one of the world's leading nations for installed wind capacity, the production and installation of photovoltaic systems as well as solar-thermal power systems. However, rapidly increasing energy demands issue a huge challenge to China.

CASE STUDY: South African Renewables Initiative (SARi) – An Example for Best Practice?

One of the most outstanding initiatives currently under way is the South African Renewables Initiative (SARi). SARi was developed in South Africa and is soundly calculated. SARi itself is not an integral LCDP but a potent component of such and an excellent example of how international cooperation between developing and developed nations yield fruit in sustainable development and potentially important greenhouse gas emission reductions.

In 2009 South Africa has introduced a Renewable Energy Feed In Tariff (REFIT) to foster the deployment of renewable energies. Although the competitiveness of renewable energies has constantly increased in recent years, mainly due to rising prices for electricity from coal-fired power stations (90 percent of South African power supply is generated on the basis of coal). However, the REFIT has not yet started to yield fruits. The main remaining obstacles are missing institutional and logistical elements to operationalize the program. SARi aims to complement the national funding of the REFIT program with international funding. Thereby, it will decrease the financial burden for the South African poor that already suffer from the constantly rising electricity prices and increase payment security for potential investors.

It is interesting to notice that the main motivation of the South African Government is to build up an own Renewable Energy Industry to participate in the global low carbon race. Addressing climate change is seen as an important side effect. SARi envisages that 8000 MW of each, wind and concentrating solar power are to be built by 2020. Through high enough renewable energy penetration a domestic renewable energy industry shall be developed in South Africa with some 30,000 to 40,000 green jobs and an attractive environment for private sector investments.

SARi could help to reach and even significantly surpass South Africa's renewable energy goal (to date only 4 percent of the 10,000 MW announced in 2003 to be installed in 10 years time have been realized).

Funding for SARi could be provided by various approaches. South Africa prefers to organize funding via bilateral cooperation. Therefore, the government is negotiating with UK, Norway and Germany about the possibility of cooperation.

The SARi project is still under development and is still facing headwinds even within the South African government. However, it represents a very promising approach of international cooperation to promote the use of renewable energy and mitigate climate change in a developing country on a truly cooperative basis. Projects like this increase trust of developing and developed countries in the respective willingness to develop prosperous and to take mitigating climate change seriously. Such projects are important steps to create the desperately needed international dynamics.

3.3 Climate resilience and low-carbon development in vulnerable countries

Typically, those countries that are mostly affected by climate change are developing countries with a high portion of poor and extremely poor population. In recent years, many countries have recognized the adverse effects of climate change, which they are facing, and the importance of mitigation of and adaptation to climate change. As a consequence, these countries have become strong voices in the international climate change negotiations arena. Some of these countries even lead the way in adaptation planning. Despite their low levels of development and their negligible historic responsibility for climate change, many countries have recognized that they should not only adapt to but also mitigate climate change themselves, to set examples for other countries to follow and thus to increase the chances for global warming to be halted substantially below 2°C.

3.3.1 Interlinked mitigation and adaptation in Bangladesh

One of the most progressive among most vulnerable countries[16] is probably Bangladesh. In 2008, updated in 2009, the government announced its Climate Change Strategy and Action Plan. The main focus obviously is adaptation as Bangladesh is particularly prone to inundations caused by the Himalayan monsoon system and tropical cyclones in the Bay of Bengal. Despite the low absolute and relative contributions to global greenhouse gas emissions – Bangladesh's per capita emissions amount to only 0.9 tons of CO_2 equivalent, including all relevant greenhouse gases, land-use change and forestry (Rank #174 in the world)[17] – the country also foresees mitigation programs and actions. Besides programs of waste management, deployment of renewable energies and measures to improve energy efficiency, two programs were announced that couple mitigation and adaptation efforts in a particularly close manner: The first project is devoted to food security and more resilient crops from the adaptation perspective and to reducing greenhouse gas emissions from the agricultural sector. Currently rice farming on continuously flooded fields releases significant amounts of methane. Modern farming practices, however, could yield more productivity, more profits and at the same time reduce direct methane emissions from the fields and indirect emissions from the typically diesel-fired pumps used for irrigation. The second example is a large-scale mangrove reforestation project. By restoring and creating new mangrove forests on some 3,000 kilometers of Bangladesh's shores, significant amounts of CO_2 can be stored and at the same time shores and coastal areas are protected from increased wave erosion due to rising sea levels.

Climate change has entered the mainstream of policy-making in Bangladesh. The Ministry of Environment and Forests through the new Secretary of the National Environment Committee coordinates the work regarding all aspects of climate change. All other related Ministries and governmental agencies are represented in that body as well. Bangladesh is also determined to frequently include the different stakeholders of civil society in the process of climate protection. The Bangladeshi LCDP includes several

[16] In the context of UNFCCC negotiations there exists no formal definition of the group of most-vulnerable countries. However, typically the term refers to the group of small island developing states, the 50 least developed countries (according to the Human Development Index) and the whole continent of Africa.
[17] According to Climate Analysis Indicators Tool by World Resources Institute (http://cait.wri.org)

programs to built capacity in all sectors and on all levels to further strengthen and accelerate the process.

The implementation of Bangladesh's LCDP has just started. Funds have been allocated to the respective bodies for the first time. However, at this early stage it is difficult to judge the progress. Especially important aspects of the LCDP such as civil society participation and particularly the mitigation pillar of the plan have not really been initiated. This is partly also due to lack of funding. Although some donors such as the United Kingdom, the European Commission and some other European countries already have pledged some contributions, available funding significantly falls short of the estimated need of 1bn US$ per annum. Within the Bangladeshi society consciousness of the threats of climate change and the need for adaptation and mitigation is increasing. However, the issues are still far away from being mainstream.

4 The international dimension

These promising examples of on-the-ground mitigation and low-carbon development are important steps on the route to limit global warming. However, climate change is a global problem, and solutions of global scale are needed to effectively combat global warming. Therefore, such initiatives must not remain in isolation of each other. Coalitions between developing and developed nations as well as regional cooperation are vital to multiply the effects of efforts. On the one hand, coalitions and close cooperation allow for fruitful exchange of experiences in the different countries. Learning from each other's experience to avoid mistakes is essential to speed up mitigation to the required pace and to leapfrog the unsustainable development stages, today's industrialized countries have passed.

On the other hand, coalitions and successful cooperation can build trust among the participating parties and thus inspire the dynamics of the United Nation's climate change negotiations. The Cancún Agreements mean a substantial paradigm shift. In Copenhagen the attempt to establish one overarching top-down climate agreement failed. In Cancún a new strategy of converging top-down and bottom-up approaches was initiated. However, only if the Cancún Agreements are seen as the starting point of an upward spiral they can play the necessary role to limit global warming as required.

Based on the Cancún agreements, it is now up to nations around the world to create additional dynamics. Based on needs assessments, countries should develop low carbon and climate resilience development plans. They have to implement the necessary political framework to make investments in mitigation and adaptation possible.

There is an urgent need for coalitions - both South-South and North-South - to enable, support and co-finance needs assessments, plan developing and then implementation of these plans. These coalitions should embrace the most progressive, the most vulnerable and the most relevant countries. It is up to the international process, in UNFCCC as well as in G20 and other fora, to install the necessary innovative funding structures, to fix the details of the Green Fund and the registry, to organize the matching between needs based action and financing.

From now on, the combination of action, coalitions and negotiations will drive the process forward - or cause its halt. Trust building between parties and a common understanding of the respective circumstances and needs is therefore more urgently needed than ever before to create the momentum that is needed to fill that remaining gap between the current and the necessary effort.

One important example for broad multinational coalitions is the creation of the "Cartagena Dialogue for Progressive Action". This group of currently 29 countries[18] has met the first time in Copenhagen and is since then a constructive informal group that aims to strengthen the voice of the progressive in the UNFCCC context, thereby pragmatically focusing on convergence around the core topics of the climate change negotiations. In the

[18] Antigua & Barbuda, Australia, Bangladesh, Belgium, Chile, Colombia, Costa Rica, Denmark, Dominican Republic, Ethiopia, France, Germany, Guatemala, Indonesia, Malawi, the Maldives, Marshall Islands, Mexico (as President of the Cancún meeting), Netherlands, New Zealand, Norway, Panama, Peru, Rwanda, Samoa, Spain, and UK

run-up to Cancún the Cartagena Group has played a very constructive role and contributed substantially to the rebuilding of trust among parties.

Alongside this group there exist a number of bilateral initiatives that focus on climate change mitigation. Below is a list of some key players that explains the focus of their collaboration.

- **Germany:** The German government pursues international climate collaboration through different routes. One is via the German development agency GIZ. One of the most prominent of the GIZ's collaborations is the Sino-German Environmental Policy Program. Another very innovative channel of German outreach is the "Internationale Klimaschutzinitiative" (IKI, International Climate Protection Initiative) that funds and supports individual mitigation and adaptation projects but also the development of the national climate strategy as is the case with Thailand.

- **European Commission:** The EU maintains environmental as well as dedicated climate change partnerships mostly with emerging economies such as China, India and South Africa. With all these countries working groups have been installed to conduct a dialogue on environmental policies on a regular basis to promote sustainable development and low-carbon technologies.

- **United States:** The US also pursues strategic collaborations in the broader field of climate change. As in most other developed and emerging economies these partnerships are to a large extent driven by energy security reasons. One of the crucial challenges of sustainable bilateral partnerships is to establish massive energy efficiency and renewable energy uptake as key strategies for energy and climate security. Two exemplary US initiatives are the "Energy and Climate Partnership of the Americas", which includes the US and a host of Latin-American countries and the "Asia-Pacific Partnership on Clean Development and Climate" with Australia, Canada, China, India, Japan, Korea and the United States.

- **Regional Collaborations:** Additional to the miscellaneous north-south partnership programs described above, there exist some regional collaboration initiatives. The Caribbean Community tackles climate change issues with the Caribbean Community Climate Change Center and its programs on adaptation and renewable energy deployment.

- **Multilateral Development Banks:** Under certain circumstances these can play a strong role as focal points and moderators of financial climate collaboration. Inside of as well as outside of the United Nation's arena multilateral development banks can develop innovative investment and risk reduction instruments. These are urgently needed for large-scale transformational bi- or multilateral partnerships and collaborations. Nevertheless it is crucial that more attention is being paid to respect and implement environmental and social safeguards, an often raised criticism on the performance of the MDBs.

An Example for International Cooperation – Guyana and Norway

In November 2009 the governments of Norway and Guyana signed a Memorandum of Understanding that constituted the bilateral cooperation between the two states. They agreed that the implementation of the National Low-Carbon Development Strategy developed by Guyana shall be financed primarily by Norway. The countries agreed to cooperate in three main areas:

- A regular, systematic policy and political dialogue to facilitate a constructive exchange of views on global climate change and relevant environmental issues such as biodiversity
- Collaboration, knowledge building, and sharing of lessons learned within the field of sustainable, low-carbon development, with REDD+ as the key component of this (REDD+ is a mechanism that aims to assign a monetary value on eco-system services and carbon storage capabilities of forests to create an incentive to reduce emissions from deforestation and forest degradation)
- Collaboration on REDD+, including establishing a framework for performance-based financial support from Norway into a Guyana REDD+ Investment Fund

Guyana is a country with vast tropical forests that are still largely untouched. However, it is endangered by higher-value agricultural developments, timber production, oil drilling and national infrastructure developments. The core element of the national LCDS is the reduction of emissions from deforestation and degradation by 25 percent in 2015. The Memorandum of Understanding between Norway and Guyana constitutes that the revenues of the REDD+ scheme should be used to finance further mitigation actions in other areas such as energy related greenhouse gas emissions.

The bilateral cooperation initiative between the two countries is among the most advanced in the world. In October 2010, not even one year after the signing of the Memorandum of Understanding, the Guyana REDD+ Investment Fund was created and Norway had transferred the first 30 million US$ of presumably 250 million US$ up till 2015 depending on the performance of the REDD+ activities.

For international negotiations the experiences of mitigation coalitions are valuable input. On the one hand, such initiatives can proof how the allocation of funding from developed countries can effectively lead to reduced emissions in developing countries and thus lay the groundwork for a broad internationally agreed mitigation scheme under United Nation’s authority. On the other hand, cooperation can provide a valuable testing ground for institutional structures and governing bodies that can than be fed back into the climate change negotiations process and thus create, to a certain degree, accomplished facts that help to speed up the implementation of a new climate change regime. The fast-start financing package agreed in Copenhagen is the footing for such cooperation under the current circumstances. The 30 billion US$ of funding for mitigation and adaptation measures from 2010 to 2012 are intended also to enable innovative pilot projects of engaged collaboration that lead to low-carbon development. All inputs generated by such collaborations contribute to develop a standardized model that can ultimately be agreed upon in an international treaty.

5 Conclusion

The Cancún talks have reanimated international climate negotiations under United Nation's guidance. The agreement of the last hours of Cancún switched international climate politics back on a track that may lead to effective climate change mitigation. However, the current pace is by far not sufficient to reach that goal.[19] All the more, on the ground mitigation actions are needed to gather momentum and finally speed up the international negotiations. Many promising examples from developing countries show that the self-proclaimed but not yet fulfilled leading role of the European Union on the front of combating climate change already has found active allies. This momentum must now be amplified by international coalitions. Close political dialogue as well as technical and administrative cooperation to build up capacities in all relevant segments are needed to learn from each other's experiences and thus to make climate change mitigation and adaptation efforts more efficient. Especially in the field of mitigation actions, where energy efficiency is concerned, profound economic potentials exist, which can then add to sustainable development if unlocked. If these efforts can be managed to be orchestrated to generate a momentum, it would substantially increase the chances of a new global treaty that is potent enough, both with regards to ambition as well as to its binding character.

[19] According to http://www.climateactiontracker.org/ in December 2010

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