Minding the gap:

Clean, low-carbon development in emerging economies: challenges and opportunities

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Climate change and its impacts are upon us; the climate system is dangerously close to several tipping points – and irreversible damage. The Copenhagen Accord, a declaration supported by countries whose emissions add up to 85% of global emissions, sets a temperature rise limit of 2°C.

However, the voluntary pledges made after Copenhagen, even if countries did what they promised, would result in a warming of 3°C or more – a temperature increase that would lead to dangerous climate change with irreversible, large-scale impacts. Already a 1.5°C rise in temperature is considered by scientists as too dangerous.

The industrialised world – responsible for the vast majority of historical greenhouse gas emissions - has failed to adequately respond to the climate crisis. Instead of showing leadership, it has largely insisted on pursuing a business-as-usual, dirty energy pathway that will only aggravate the crisis. US intransigence remains the biggest threat to a global climate deal.

The emerging economies, on the other hand, have a historical opportunity to help close the ever-increasing gigatonne gap – the gap between the commitments made in Copenhagen and the emission reductions that are needed to prevent dangerous climate change.

BASIC countries (Brazil, South Africa, India, China), are looked upon by other developing countries as leaders of the developing world. With this increasing influence, BASIC countries have a responsibility to show climate leadership and ensure that they do not follow the carbon-intensive development pathway of the developed countries.

The dynamics of the world are changing: today, it is not only industrialised countries, holding all the cards. The emerging economies, such as Brazil, South Africa, India, China, Indonesia and Mexico are hugely important. These countries are not only the most rapidly growing economies in the world; their geo-political importance is also strengthening by the day.

This briefing paper looks at policies and measures that are currently being considered by developing countries. If instituted and implemented, they could put these economies towards a green, low carbon development path.

Common but differentiated responsibilities

The ultimate objective of the 1992 UN Framework Convention on Climate Change is:

"… stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"

In order to achieve this, all countries will have to reduce their greenhouse gas emissions in the medium and long-term. The Convention clearly states that this will have to be done *"on the basis of equity and in accordance with common but differentiated responsibilities and respective capabilities"*.

The exact implication of this principle has been discussed many times. As of yet, however, there is no agreement on the best way to share efforts to reduce global greenhouse gas emissions according to the common but differentiated responsibilities principle.

At the same time, scientists are clearly indicating that time for effective action against climate change is short and that there is no room for delaying further increased efforts from all major emitters.

In fact, in order to avoid dangerous climate change, the total amount of greenhouse gases that the world can emit between now and 2050 is extremely limited. In order to keep the annual reduction rate achievable, global emissions should not exceed 40 $GtCO_2$-e in 2020.[1]

Such a "carbon budget" sets a physical limit to what is acceptable – and challenges countries to find ways to reduce emissions in order to stay within that limit. This can only be done if both developed and developing countries make greater efforts to reduce emissions beyond what is currently on the table.

It is clear that such an effort should take into account the differences that exist between countries, and that responsibilities are shared according to what capacity a given country has.

Greenpeace has developed a number of principles that should guide any equitable effort-sharing. These principles include:

[1]Meinshausen, M., Hare, W., Raper, S.C.B., Frieler, K., Knutti, R., Frame, D.J. & Allen, M. 2009. Greenhouse-gas emissions targets for limiting global warming to 2°C. Nature 458: 1158-1162.

- climate action needs to be fair and equitable, and needs to support development;
- industrialised countries need to take the lead, but all countries should engage;
- efforts should be shared on the basis of historical responsibilities and capacity to act;
- rich countries have an obligation to support mitigation and adaptation in poorer countries.

Efforts by the emerging economies - and how they can do more

Emerging economies have been actively trying to show leadership in preventing dangerous climate change. The BASIC countries after their meeting in South Africa in April 2010, expressed their "determination to continue to show leadership in acting on climate change".

However, on closer inspection, it is clear that in spite of encouraging initiatives, these developing countries could do more.

This section will briefly look at proposed mitigation actions by emerging economies, their implementation and areas where there is room for improvement, with a particular focus on three key areas: renewable energy, energy efficiency and stopping tropical deforestation.

Renewable energy

China is becoming one of the leaders in renewable energy development, not only among the emerging economies, but globally. By the end of 2009, China's wind power had doubled in installed capacity for four years in a row.

In 2009, China became the biggest investor in clean energy in absolute terms, exceeding the US as the biggest new market for wind power, becoming the second largest in installed wind turbines, and the biggest producer of solar PV and solar water heaters.

India has now established a Renewable Energy Certificate Mechanism, a market trading mechanism for achieving renewable energy purchase obligations for the various states within India. The mechanism would be functional by 2011. Early this year, India's Finance Minister, Pranab Mukherjee, announced the creation of a 'National Clean Energy fund', which will fund renewable energy development in India. The income for the fund is generated by a coal tax of approximately USD $1 for each tonne of coal consumed in India.

Brazil has recently taken encouraging steps towards implementing a robust support framework for renewable energy. Whether these plans will indeed be implemented, remains to be seen.

Indonesia, Mexico and South Africa still lack enabling policy mechanisms (i.e. feed-in tariff, renewable portfolio standard) that would catalyse investments for renewable energy on a larger scale.

South Africa's target for renewable energy is still very modest (a mere 4%) and the barriers to entry for renewable energy still need to be removed.

In Mexico, legislation on renewable energy was set between 2008 and 2009. The Law for the Use of Renewable Energies and the Financing of the Energy Transition[2] regulates the use of renewable energy sources and clean technologies to generate electricity, when it is not used for the public service.[3] Despite this, renewable forms of energy still lack priority status and the absence of sufficient regulations continues to hamper the widespread use of renewable energy.

Currently sustainable renewable energy use only accounts for a small share of the overall energy mix in the emerging economies, so there is clearly a need for even more robust action on renewable energy overall.

The potential for renewable energies in developing countries is huge. The Energy [R]evolution scenario, a global blueprint for renewable energy future, commissioned by Greenpeace and the European Renewable Energy Council[4], demonstrates how renewable energy can become the main source of energy in emerging economies by 2050, covering 47-85 % of their energy needs. This uptake would replace coal and nuclear and cut emissions dramatically compared to business-as-usual development. The report also argues why an energy future that is based on efficient production, transmission and use of renewable energy will be economically and socially more beneficial than continuing to rely on dirty energy.

Decentralised Energy and Energy Efficiency

Despite the positive developments in renewable energy in recent years, the current energy paradigm in emerging economies is the same one that industrialised countries chose decades ago: to build large, centralised power generation systems - mainly thermal, coal-fired power plants.

In some cases, this energy paradigm has failed to provide quality power to the rural sector. In the case of India, for instance, the rural population is the last to be brought into the centralised grid system and still has no access to reliable electricity.

In South Africa, access to electricity remains a huge problem and, ironically, some communities that live beside huge power plants have no access to power from the grid. Power is mostly directed towards large load centres (generally cities) and energy intensive industrial users. The remaining power is then distributed among the rural poor in the country: a clear case of energy injustice.

It is apparent that large, centralised power production alone cannot effectively deliver power needed by a widely dispersed population. In India, for example, power from centralised power plants is directed towards large-load centres, like big cities. Centralised power plants take a long time to get operationalised.[5] That is why decentralised renewable energy is also necessary.

2 Published in the DOF (Official Diary of the Federation) on November 28th, 2008.
3 Published in the DOF on September 2nd, 2009.
4 http://www.energyinfo.org
5 www.greenpeace.org/raw/content/india/press/reports/stillwaiting.pdf

While efforts are underway to reduce emissions in emerging economies, their untapped potential for energy efficiency measures remains huge. There is a wide recognition that energy efficiency can play a vital role in avoiding emissions and lowering energy costs, but in most cases consistent policies and measures to ensure smarter production, transmission and use of energy are still not in place.

The Energy [R]evolution scenario details a series of energy efficiency measures that, together, can substantially reduce demand across industry, homes, business and services, while delivering the same services at lower energy costs. It focuses on current best practice and technologies that will become available in the future, assuming continuous innovation. The energy savings are fairly equally distributed over industry, transport and buildings and can, by 2050, cut primary energy needs in emerging economies by 20-40 % compared to the business-as-usual scenario of the International Energy Agency.

Reduce Deforestation

Brazil aims to reduce deforestation by 80% by 2020 as part of its mitigation pledge. Deforestation has dramatically dropped (from 28 thousand square km in 2005 to 7.4 thousand in 2010)[i]. Millions of hectares of forest have been protected and many Indigenous lands have been defined. However, Brazil could do much better still by increasing its goal to zero deforestation in the Amazon by 2020, maintaining its Forest Code and by installing a credit restriction policy that stops national developing banks from financing forest destruction.

Brazil has also created a national plan for emission reductions. However, with an outdated national inventory, its graduation into national policies has been slow and lacking transparency. Brazil's Copenhagen Accord target is 36.1% to 38.9% by 2020.

Greenpeace sees a zero deforestation policy and legislation as the only way for Brazil to show it is seriously committed to reducing GHG emissions by 38.9%. as 75% of its total emissions are caused by deforestation.

Indonesia aims to unilaterally reduce emissions by 26% compared to business-as-usual by 2020, and 41% with support from the international community. Most of these emissions reduction efforts will come from forests (13.3%) and peatlands (9.5%).

The Letter Of Intent (LOI) between Indonesia and Norway, announced in May 2010, was an encouraging initial step of forest protection cooperation under the UN's REDD (Reduced Emissions from Deforestation and Degradation) scheme, where countries agreed to set up new agencies to finance and execute forest protection measures in Indonesia and measure, report and verify their results. In addition, Indonesian President Susilo Bambang Yudhoyono has announced a two-year moratorium on new logging permits on peatlands and forests. This will be formulated into a Presidential Decree, which will take effect in January 2011.

This is a crucial moment for Indonesia to reduce its emissions from deforestation. However, so far the measures planned are not enough to prevent the loss of vast areas of natural forests and their value as carbon sinks. To ensure full protection of all peatlands and remaining forests, the Presidential Decree on Moratorium should include a comprehensive review of the existing forestry concessions and the limitations in peatlands protection should be eliminated.

Domestic implementation of climate plans

Most of the emerging economies have pledged to take action to reduce their greenhouse gas emissions and announced numerical targets. However, to a large extent, these pledges have not yet been actively implemented into national plans and policies.

For example, South Africa has proposed an attractive target that aims to reduce its emissions by 34% by 2020 and 42% by 2025 compared to business-as-usual. However, this international ambition is not currently being matched by rapid or cohesive domestic action.

Energy efficiency is gaining some attention in South Africa, with the planned rollout of a million solar water heaters, together with demand side management, although the implementation of this is too slow. And although the barriers to entry for renewable energy are slowly being removed, a 100MW Concentrated Solar Power project, and a 100MW wind energy project are so far the only biggest renewable energy projects proposed. These are clearly insufficient to contribute much to the overall emission reduction pledge.

South Africa is also engaged in a policy process that will outline how the country will respond to climate change, and an integrated resource plan process that will define what the electricity mix will look like for the next 20 years. However, there is a lack of co-ordination between key policies and this plan: the policy is not expected to be finalised until *after* the plan. It is crucial that energy and climate change plans and policies are co-coordinated and effective and that they result in a coherent strategy to meet the emissions reduction pledge that South Africa made in Copenhagen.

In Mexico the current emission reduction pledge for 2020 lacks the policies that would ensure it will be met. The current climate policies will expire in 2012 with no clear pathway towards achieving its proposed 30% deviation from business-as-usual by 2020.

While Mexico has a mandatory policy on climate action under the Special Programme on Climate Change (PECC), its existing energy policy completely undermines the PECC. The National Strategy on Energy, issue in 2010 and with a horizon of 14 years, keeps fossil fuels as its main source of energy generation.

Conclusion

The mitigation actions that developing countries have pledged are encouraging, especially in light of the weak efforts pledged by industrialised countries.

However, if we are to avoid dangerous climate change, there is no doubt that both the industrialised countries and the emerging economies can - and must - do more.

Emerging economies cannot afford to repeat the mistakes of the rich countries. If the world is to avoid dangerous climate change and stay below 1.5°C, emerging economies need to leapfrog dirty technologies and head straight to a green economy through a massive uptake of clean energy, ambitious measures to improve energy efficiency and protection for forests. This will require international coordination in technology and finance.

Case Study: China

Carbon tax in China: critical step towards green, low carbon growth

Green taxes, such as sulphur tax, carbon tax, resources tax, and energy tax, are the principal means of reforming the energy pricing mechanism, restructuring economic development and protecting the environment. They have increasingly become the focus of public debate in China.

Whether China should levy a carbon tax has been one of the most heated topics of discussion to emerge from this debate. Introducing a carbon tax would not only curtail the use of fossil fuels and control CO2 emissions; it would also help transform the model of economic development.

Today, the main impediment to China achieving low-carbon, sustainable economic growth is the country's irrational reliance on coal as the major energy source.

China is the world's largest producer and consumer of coal and coal accounts for 70% of the nation's energy consumption. In 2007, every tonne of coal used in China caused RMB 150 worth of environmental damage, but the current pricing system has no way of truly reflecting this damage[6]. High-speed economic growth has brought along a rapid increase in energy demand. This has not only put the spotlight on the issue of energy security, it is also causing energy-related environmental problems to become increasingly serious.

The timely introduction of a carbon tax could push up the prices of fossil fuels – primarily of coal – and would thereby reduce their consumption in power generation and other energy-intensive industries. This would ultimately lower the use of non-renewable energy, and increase the competitiveness of efficient renewable energy.

The inevitable result would be a promotion of industrial restructuring and optimisation, lowering energy consumption, accelerating emissions reductions and the development and use of renewable energy. All this would help putting China on a path towards realising low-carbon economic growth.

China is one of the biggest victims of climate change. For example, the eight-month 2010 drought in south-west China, that covered five provinces, was considered one of the worst droughts this century. By the time the drought ended, one in four people no longer had access to drinking water. The drought also pushed 4.5 million people back under the poverty line.

Experience has shown that a carbon tax can be an effective economic measure for tackling climate change and controlling carbon dioxide emissions. China could also use a carbon tax as a key tool to reach its 40-45% target for the reduction in carbon intensity by 2020. Such action would be beneficial in enhancing China's standing in global climate talks.

Revenue from a carbon tax could help increase funding support in energy conservation and emission reductions. It could be used to encourage the development of clean technologies, such as energy efficiency and renewable energy, as well as to accelerate the pace of low-carbon growth.

- The time is ripe, both domestically and overseas, to introduce a carbon tax in China. The pricing reform of resource-based commodities made definite progress during the period of China's Eleventh Five-Year Plan (2006 to 2010), but Greenpeace believes that during the period of the Twelfth Five-

[6] 2 Greenpeace et al. The True Cost of Coal, October 2008

Year Plan (2011 to 2015), China should levy a carbon tax as soon as possible, in order to accelerate resources price reform, in particular that of highly polluting coal. By levying a carbon tax, China could truly begin its transition towards a green economy.

Case Study: Mexico

Harmonising climate change measures with action on the ground

In some developing countries, there is a huge disconnect between mitigation action proposed at the international level and domestic efforts. Mexico is one of them.

Currently, Mexico has a mandatory policy on climate action under the Special Programme on Climate Change (SPCC). The programme was issued in August 2009 and continues until 2012.

This policy, albeit short-term, seeks to mitigate 129 MtCO2e in total during 2008-2012 (in parallel with the first commitment period of the Kyoto Protocol). If successful, it would mean that total emissions would reach a peak in 2012, at 735 MtCO2e, and start declining thereafter, which would be required to achieve the aspirational aim of 30% deviation from business-as-usual by 2020 - as President Calderón announced in Copenhagen last year.

However, the existing energy policy completely undermines the efforts of the SPCC. Mexico's National Strategy on Energy (NSE), issued in 2010 and with a horizon of 14 years, keeps fossil fuels as the country's main source of energy generation. Worse still, oil production is expected to increase through restoring the proven reserves by 100% to a production of 3.3 m barrels per day in 2024.

The NSE also seeks to increase its "clean energy" mix to 35%. However, this target includes big hydro projects and nuclear power. For renewable energy there is no target. An energy efficiency potential of 280 TWh has been identified, but no regulation or economic incentives are in place to achieve it.

Efforts under the SPCC present a good step forward in Mexico's attempts to help to stop dangerous climate change, but Mexico can do more. Previous versions contemplated by the SPCC were, in fact, double the current proposed target (260 MtCO2e).

Greenpeace believes that the SPCC provides a good basis to create a long-term policy on climate change. However, it needs to become a long-term policy enshrined in legislation – it cannot end in 2012. This means that Mexico must:

- align energy policies under the NSE with the 2020 aspirational target and the climate policies outlined in the SPCC;
- shift the current dirty energy matrix to a cleaner and more sustainable one that includes energy efficiency.
- renewable energy needs quantifiable goals that need to be backed with robust regulation and financial incentives;
- commit to zero deforestation by 2020.

Currently Mexico faces a historical opportunity. As the COP 16 President, it can show strong leadership through action. The country must renew its domestic policies, mainly on energy and

forestry, and strengthen the Special Programme on Climate Change. Otherwise the international community will not take its 2020 pledge seriously.

Case study: South Africa

Saving the climate equals thousands of jobs

South Africa is a country almost entirely dependent on coal for its electricity supply. It is also a country facing the massive challenges posed by poverty, joblessness and climate change.

Given how important job creation is, Greenpeace Africa commissioned a study from the Institute for Sustainable Futures at the University of Technology, Sydney to determine to what extent acting on climate change would benefit South Africans through the creation of green jobs.

This study found that an increase in renewable energy and energy efficiency – in line with Greenpeace's Energy [R]evolution scenario for South Africa – would be a major employment creator in South Africa, with a net increase of 78,000 jobs by 2030. This number is much higher than under the business-as-usual scenario of the International Energy Agency (IEA), that predicts the generation of only 48,000 jobs[7]. This means that acting on climate change can significantly benefit sustainable job creation in South Africa.

The study only calculates direct employment associated with electricity production, including jobs in fuel production, manufacturing, construction and operations and maintenance. It also calculates energy efficiency jobs associated with reducing the need for electricity, and jobs associated with coal exports. Indirect jobs have been excluded from the analysis, owing to the considerable uncertainties involved. With indirect jobs included, the overall number of jobs would be significantly higher.

The study also includes an enhanced manufacturing scenario, under which South Africa also manufactures 50% of renewable energy equipment locally by 2030, and becomes an exporter of this technology. Such a scenario would take the net job creation to 111,700 by 2030.

Investment in renewable energy on a large-scale, along with active support for local renewable technology manufacturing, presents an attractive opportunity for sustainable economic development and significant job creation. South Africa needs to decide now whether to invest in green jobs, or remain stuck in dirty energy and fewer jobs. In order to choose the right pathway, the following steps must be taken:

- The level of ambition regarding renewable energy must be drastically increased, with South Africa setting an ambitious, legally binding renewable energy target to obtain a minimum of 36% of its electricity from renewable energy by 2030.
- A co-ordinated policy of internationally legally binding targets related to CO_2 emissions reduction and long-term stable domestic support for renewable energy must be implemented.
- There needs to be a significant reduction in South Africa's reliance on coal, and nuclear energy must be phased out.

[7] South African Energy Sector Jobs to 2030, 2010, Jay Rutovitz, http://www.greenpeace.org/africa/en/Press-Centre-Hub/Publications/South-African-Energy-Sector-Jobs-to-2030/

Case Study: India

Decentralised Renewable Energy: Energy Justice for the Poor

India has been actively trying to take ambitious actions on climate change. Yet India's efforts could be much better. One of the critical areas India needs to focus on is energy. Right now India's growing electricity needs are met by coal that comprises close to 60% of India's installed power capacity, while the share of renewable energy resources (excluding large hydro) is just touching 10%.

The current energy paradigm in India is to build large, centralised power generation systems, mainly thermal plants (coal, gas), large dams, and now also nuclear power.

Despite the country's incessant build-up of power plants, one third of India's population does not have electricity. Those that do continue to suffer from frequent power outages. The average per capita power consumption is estimated to be 704 kwh – a third of the world average of 2,300 kwh.

Along with a power deficit, the country faces technical and electricity distribution losses to the tune of 30% annually. It is apparent that the addition of more large, centralised power is not the best model for providing efficient electricity solutions to a country with as widely dispersed a population as India.

Under the current scenario, the rural population is the last to be brought into the centralised grid system. It currently has no access to reliable electricity. In India, power is mostly directed towards large load centres, generally cities. The leftover power is then distributed among the rural poor in the country: a clear case of energy injustice.

The solution to this lies with decentralised renewable energy systems. Production of electricity at the point of consumption not only ensures greater access, but much better control over a critical input for development.

Decentralised renewable energy through hybrid systems of wind, micro hydro, solar PV and biomass, along with development in smart grids, would ensure that a substantial population without electricity in India would gain access in a sustainable way.

Decentralised energy would provide a comprehensive package for fulfilling the energy needs of rural India: It would not just help meeting the need for electricity, but also for cooking fuel. Communities would be enabled to produce and manage their power according to their needs and utilise local resources.

Since development is often synonymous with access to power, quality energy supply from decentralised renewable energy would energise households, schools, and health centres. It would lead to improvement in agricultural productivity and encourage employment-generating activities. It would also foster the inclusive development of India's rural populace, bringing this part of the country on par with urban areas in terms of amenities, facilities and opportunities, consequently stopping the migration flow from rural to urban areas.

Decentralised energy would ensure that ideals of inclusive growth are met and a harmony prevails between growth and action on climate change.

The time for an Energy [R]evolution is now, and decentralised renewable energy is at its core. To achieve this, the following steps must be taken:

- India should undertake energy sector reforms along with a streamlined renewable energy policy, in order to accommodate decentralised renewable energy within the energy sector.
- Further ambitious efficiency measures, such as pilot smart grid systems, need to be taken in order to plug massive energy losses.
- A renewable energy law with ambitious targets for 2020 should be enacted.

Currently, Greenpeace India is working on trying to bring decentralised renewable energy to one of the poorest states in India, Bihar, in the north eastern part of the country.

Case Study Brazil

Tapping the vast renewable energy potential

The Brazilian potential for wind energy generation is enormous and continues to remain untapped. According to data from the National Wind Power Atlas, produced by the Federal Government, Brazil's wind energy potential could be as much as 143 gigawatts (GW).

With offshore turbines, the potential is even bigger. In the northeast of the country, the wind potential reaches 75 GW, from which 25 GW are concentrated in the state of Ceará.

However, an enabling mechanism to tap this huge potential, and catalyse investments for renewable energy on a large scale, is still missing. Today, Brazil only produces 800 MW of wind energy, which equals to less than half a percent of its total potential.

Brazil has taken some encouraging steps: A public auction focused on wind power took place in 2009; two further auctions taking in all types of renewable energies were carried out in 2010. These auctions serve as a bridge between producers and public energy utilities. They are a guarantee of purchase to the producer and a guarantee of supply to the utility.

This policy mechanism is a first step towards a Brazilian Energy [r]evolution, and will result in 70 wind farms being built in the next two and a half years. Brazil's Northeast Bank is also offering financing with low interest, making the renewable energy market increasingly competitive.

However, further steps are required.

Greenpeace has actively contributed to a national Renewable Energy Law, which was recently approved by the Special Commission of Renewable Energy. Currently, the law is waiting approval from the House of Representatives in order to move to the Senate. It contains a progressive feed-in tariff regime that will further spur investments on wind energy across the country, capturing the huge wind energy potential that Brazil has to offer. The law faces opposition from sectors that feel threatened by its implementation, such as the coal industry and some utilities.

In a country with continental dimensions such as Brazil, diversifying the matrix and regionalising the strategies for energy use is a fundamental prerogative to guarantee stability in the supply of electricity, eliminating the dependency on expensive, dirty and exhaustible fossil fuels.

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