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Climate Change, Energy, and Low-carbon Development in the Chinese Context

China faces the challenge of achieving higher levels of development in times of climate change and within a carbon-constrained world. China has begun to implement plans for low-carbon growth, renewable energy and climate change policy. Other countries can learn from this experience – both from what has and hasn't worked. At the same time China can learn how to avoid following the same high-carbon development pathway as developed countries and how to develop low-carbon technologies.

Introduction

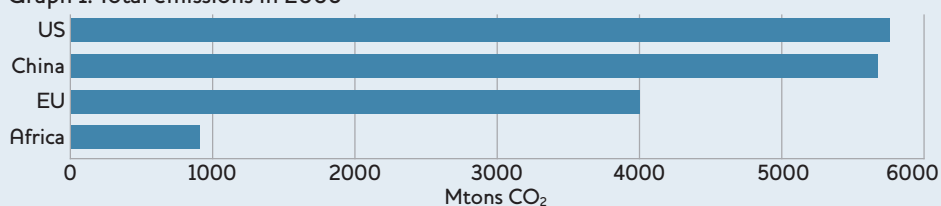
Developing countries have historically contributed very little to climate change – the main cause is the greenhouse gas emissions of developed countries cumulated over the past two centuries (graph 3). This situation will change as emerging economies like China, India and South Africa increase their emissions – according to some sources China is already the world's highest emitter of carbon dioxide, the major greenhouse gas.

China's emissions partly come from its high use of coal-fuelled energy, which is needed for sustaining and expanding its large economy. However while greenhouse gas emissions and energy use are high in absolute terms (graph 1), the per capita emissions and energy use are several times lower in China than in developed countries (graph 2). Nevertheless, the majority of China's 1.3 billion inhabitants still rely on coal as their major energy source.

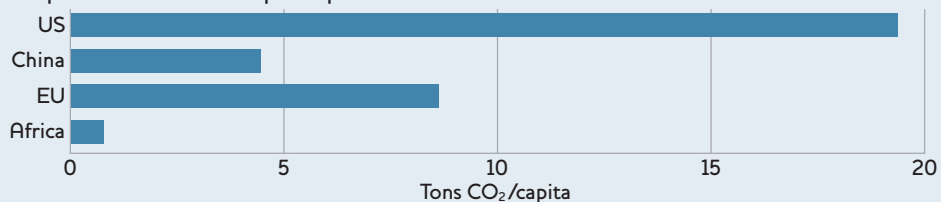
While many people from developed countries think of China as the world's

Carbon dioxide emissions by some of the world's largest emitters and the African continent

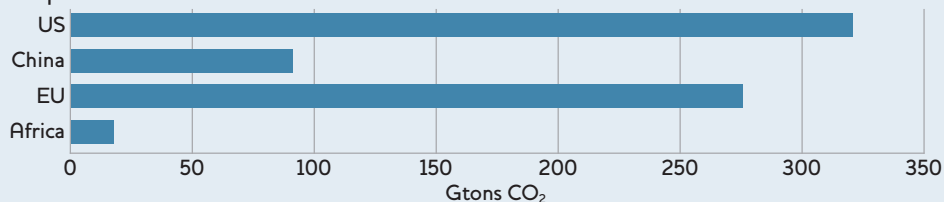
Graph 1: Total emissions in 2006



Graph 2: CO₂ emissions per capita in 2006



Graph 3: Cumulative emissions from 1900 – 2003



Source: International Energy Agency, 2009 and World Resources Institute, 2009. The data in these graphs does not account for claims by The Netherlands Environmental Assessment Agency that in 2006 China overtook the US in terms of total carbon dioxide emissions by 8 per cent.

“Rapid development during the time of climate change means that Chinese plans and programmes for low-carbon growth need to be in place and that low-carbon energy needs to be actively promoted. Technological leapfrogging will play an important role in the development process.”

largest contributor to global climate change, the Chinese viewpoint is that China is the largest contributor to ‘new’ or current emissions. The message is clear and historically correct: developed countries are responsible for the bulk of climate change which has been caused by historic rather than current emissions (graph 3). The current ‘emission space’ or ‘carbon budget’ which is globally available – the maximum emissions allowed without triggering dangerous climate change – is being taken up by developed countries, leaving very little ‘emission space’ for developing countries to develop.

In this carbon-constrained world, China is working to tackle climate change and its impacts. China ratified the Kyoto Protocol under the United Nations Framework Convention on Climate Change (UNFCCC) in 2002. The Kyoto Protocol aims to reduce greenhouse gas emissions from human activities. The Kyoto Protocol only has binding emission reduction targets for developed countries while targets for developing countries are voluntary. Despite this, China was one of the first developing countries to issue a National Climate Change Programme (NDRC, 2007a) which includes targets for low-carbon development. China also introduced a Renewable Energy Law in 2005 and set high Renewable Energy Targets on par with those of the 27 member states of the EU (NDRC, 2007b). The Renewable Energy Targets aim for 15 per cent of total primary energy consumption to be from renewable energy by 2020 (NDRC, 2007b). China further developed large-scale energy efficiency programmes and has one of the world’s most rapidly decreasing energy intensities (a measure of energy used in relation to GDP).

The lessons other countries can learn from China

China’s development over the last 30 years is unprecedented and there are several lessons to learn from China in terms of energy and climate change:

- China’s rapid development has, to some extent, defied the perception developed countries had about development and the energy sector. China has already put plans and programmes for low-carbon growth in place and actively promotes low-carbon energy use. Technological leapfrogging – bypassing basic, polluting technologies to move directly to more advanced ones – will play an important role in the development process.
- Over the past 30 years China has successfully introduced electrification schemes, providing electricity to 99 per cent of the population. In part this has happened through linking agricultural productivity and rural livelihoods to the expansion of small hydropower plants.
- The Chinese approach to renewable energy includes a Renewable Energy Law, high targets for renewable energy which are comparable to those of the European Union and a rural electrification strategy in which decentralised renewable energy plays an important role.
- The Chinese approach to tackling climate change includes a national climate change programme, incentives for energy saving, restructuring the economy to reduce the dependence on coal, high renewable energy targets and attempts for establishing a low-carbon economy.

Lessons from the Chinese Renewable Energy Law

In 2006 the government put the Chinese Renewable Energy Law into force to increase the share of renewable energy within total primary energy consumption. This law does not name any specific targets but provides the legislative framework for other policies – including the Renewable Energy Targets determined by the National Development and Reform Commission of China (NDRC). The Renewable Energy Targets (NDRC, 2007b) are comparable to those of the European Union and aim for 15 per cent of total primary energy consumption to be from renewable energy by 2020. The Renewable Energy Law and the Tenth Five-Year Plan were also the basis for setting the target to reduce greenhouse gas emissions from the energy sector by five per cent below the baseline by 2020.

The NDRC plans to promote modern biomass, geothermal energy, hydro power, solar power, tidal energy and wind energy (NDRC, 2007b). Decentralised renewable energy also plays an important role for rural electrification in remote areas. These legislative frameworks and policy targets might provide lessons for other countries to learn from. At the same time, other countries can also learn from the struggles and challenges which occurred during China’s large energy developments. For instance, at the Three Gorges Dam – the world’s largest hydropower dam – where 1.3 million people were relocated and there were high social, environmental and economic implications.

“China’s ... development in terms of energy and climate change is very complex. But it may still be possible that other developing countries – particularly other emerging economies, such as India, Brazil and South Africa – can learn from the Chinese experience.”

China’s model for development is not an easy model to learn from, and its development in terms of energy and climate change is very complex. But it may still be possible that other developing countries – particularly other emerging economies, such as India, Brazil and South Africa – can learn from the Chinese experience.

Past efforts to replicate the experiences of developed countries in developing nations – for example regarding electricity sector reforms – have had limited success due to their very different contexts. The Chinese development experience has been distinctive and it is worth investigating whether aspects of it could be used by other developing countries as part of a South-South learning process. The situation is different in each country and generalisations need to be avoided, but the strengths (e.g. promoting renewable energy) and challenges (e.g. relocation of more than a million people for hydropower dams) of the Chinese experience offer opportunities to learn from both success and failure.

The lessons China can learn from other countries

Developed countries have yet to take full responsibility for their contribution to global climate change and this makes the possibility of developing countries learning from their experiences a political issue. Within the complexity of the climate change regime and its multiple groups with different interests, there are two main ways of understanding the climate change regime: from the perspective of the developed

countries and from the perspective of the developing countries. Despite these differences China is eager to learn from other countries’ experiences with low-carbon energy and tackling climate change.

- The main lesson that China can learn from developed countries is not to repeat their fossil-fuel dominated development. A heavy reliance on fossil fuels during the development process of developed countries resulted in climate change – which today affects the poorest and least developed countries the most. This pathway should be replaced with global low-carbon development that contributes to a more climate-friendly future.
- Low-carbon technologies are crucial for pursuing low-carbon development and tackling climate change. China first needs access to these technologies and then needs to learn how to build them in China.
- Some other countries have a good track record of implementing low-carbon energy: the Scandinavians’

strong reliance on hydropower, the German, US, Spanish, Danish and Indian push for wind energy, the Brazilian efforts with bio-ethanol in the transport sector. There are numerous examples where very different incentives and policy frameworks have led to an increase in low-carbon energy. There is not a simple solution and the national circumstances require tailor-made approaches, but still the Chinese could learn from some of the ‘success stories’ of introducing low-carbon energy in various countries.

Lessons for China: access to low-carbon technologies

Low-carbon technologies will play a crucial role in the pursuit of low-carbon development and tackling climate change. Industrialised countries have mainly developed and remain in control of these technologies – such as renewable energy and carbon capture and storage (CCS).

China is keen to access these technologies through technology transfer and technology cooperation and also wants to get the skills and expertise to develop low-carbon innovation locally. The debate is very complex and there are conflicts of interest between technology diffusion and low-carbon development. Countries which have access to low-carbon technologies have an important role to play in building the capacity for China to make the transition to a low-carbon economy. One example of how to achieve this is the UK-China Near-Zero Emissions Coal Project NZEC which is a key initiative under the EU-China Partnership Agreement on Climate Change. The project aims to have a carbon capture and storage demonstration plant constructed and operational in China by 2014.

“ China is currently at a crossroads: with its rapid development it either has the option to follow the polluting high-carbon pathway... or a climate-friendly low-carbon development pathway. ”

Policy implications

- Policy-makers in China need to understand the importance of low-carbon development and the need to put supporting incentives into place. China is currently at a crossroads: with its rapid development it either has the option to follow the polluting high-carbon pathway like today's developed countries did or a climate-friendly low-carbon development pathway. Policies to tackle climate change, introduce sustainable energy and foster low-carbon development should be promoted even more in the future.
- North-South learning has been limited in relation to climate change in the past. Policy-makers in China can learn from the experience of other developing countries such as the Brazilian efforts with bio-ethanol in the transport sector, the Indian wind energy experience, Korea's transition to natural gas and nuclear energy.
- Policy-makers in China should continue to promote enabling environments for facilitating technology transfer and technology cooperation. This can only be done with the support of developed countries which need to provide adequate funding for technology transfer and cooperation with the aim to decrease the existing barriers. Technology transfer and technology cooperation between China and developed countries are important stepping stones for low-carbon development.
- Policy-makers in developed countries need to be willing to offer more support to China and other developing countries for tackling climate change and achieving low-carbon development. Access to low-carbon technologies and funding for these technologies have to be increased.
- Policy-makers in developed countries need to acknowledge their countries' responsibility for the bulk of climate change. There is a need to take serious action for low-carbon development, ambitious climate change programmes need to be introduced and more drastic cuts in emissions are

crucial. China urges that developed countries must make significant lifestyle changes if they are to meaningfully reduce global emissions, however China also acknowledges that developing countries will need to take climate actions in the future

- Other countries can learn from China's approach to tackling climate change, its National Climate Change Programme, its Renewable Energy Targets, its Renewable Energy Law, its energy saving initiatives and its efforts for low-carbon growth. This experience can be especially useful for other rapidly developing countries which are in a similar position as China regarding their increasing emissions and rapidly expanding economy.

The development community – including policymakers, practitioners, scientists and institutions – must be open and understanding towards the rise of China and the role the country is likely to play regarding energy, climate change and low-carbon development.

Further reading

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Credits

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