

LOW CARBON DEVELOPMENT IN CHINA AND INDIA - ISSUES AND STRATEGIES

Low carbon development context

China and India are major players in South-South cooperation and in the transition towards low carbon development. The sustainability of development patterns followed by China and India has significant socio-economic and environmental implications for the two countries as well as globally. China is currently the largest total emitter of greenhouse gases while India is the fourth largest. However, as the first and second most populous countries in the world, per capita output is still relatively low. China, at 7.9 tonnes/capita/year has only recently surpassed global averages, while India's per capita emission rate of 2.3 tonnes is only a third of the world average.ⁱ Though China's per capita income levels, energy consumption and progress on socio-economic indicators are higher than India, the two countries display similar trends of rising energy consumption and greenhouse gas emissions coupled with a decline in energy intensity figures. Both countries are also witnessing structural shifts in their economies with an increasing share of GDP coming from the services and manufacturing sectors. Both are looking to improve research and development and increase innovation. Differences in resource availability and governance structures must also be taken into account when developing energy and environment related policies and options in these two countries.

China and India both face similar challenges to low-carbon development in that their energy mix is heavily coal dependent (66% and 57% of total energy consumption respectively as of 2014) and energy efficiency is relatively low. Carbon emissions are primarily derived from power generation and industry rather than residential consumption as is typical of developed countries. China is the world's largest consumer of coal. India became the second largest in 2015 as it aims to expand energy access to the 240 million people without access to electricity. However, it is not expected that India's consumption levels will rise to that of China's as it is unlikely that it will develop the same levels of heavy industry as China. Meanwhile, China's coal consumption is beginning to drop.ⁱⁱ Although India's overall

energy intensity is better than China due to its different industry structure, for specific technologies, China is generally more efficient, e.g., the majority of coal-fired power generation in India is sub-critical while a large number in China are super-

Table 1 : Key practices on low carbon development in China and India

| Strategy | Country | |
|--------------------------------|---|--|
| | China | India |
| Technology and Innovation | <ul style="list-style-type: none"> • Market based demonstration and deployment • National Scientific and Technological Plan on Climate Change | <ul style="list-style-type: none"> • National Mission on Strategic Knowledge for Climate Change • National Mission for Sustaining Himalayan Ecosystem |
| Innovative Financing | <ul style="list-style-type: none"> • Green Credit Guidelines • Emission Trading Scheme | <ul style="list-style-type: none"> • Clean Energy Fund • Renewable energy certificates • Priority sector lending norms • Green Bonds • Fiscal transfers |
| Informing Sub-national Actions | <ul style="list-style-type: none"> • Low carbon pilots | <ul style="list-style-type: none"> • State Action Plan on Climate Change |

Source : Based on China-India Low Carbon Study

critical and ultra-supercritical.

Both China and India have set the framework for low carbon development at the national level. In 2012, China for the first time explicitly incorporated climate change into its 5 year plan. India developed a National Action Plan on Climate Change (NAPCC) in 2008 and in 2009 directed state governments to develop their own plans. Both China and India have also submitted Intended Nationally Determined Contributions to the UNFCCC process that emphasise increasing the share of renewables, reducing emissions intensities (GHGs per unit of GDP) and increasing reforestation.ⁱⁱⁱ

The initiative

Based on this understanding of similarities and differences between China and India, in 2012, UNDP China in partnership with China's National Development and Reform Commission (NDRC), The Energy and Resources Institute of India (TERI), the Chinese National Center for Climate Change Strategy and International Co-operation, the Central University of Finance

and Economic and Zhejiang University launched one of the first collaborative efforts between major research institutes in China and India working on climate change. The initial seed funding was provided by the United Nations Development Programme after which the Norwegian Embassy in Beijing provided support for the China component and Shakti Sustainable Energy Foundation for the India component.

The Report identified numerous emerging practices in China and India on low-carbon development in innovation policy, financing and sub-national actions (see table 1) and policy exchanges. UNDP and TERI jointly hosted open webinars for international participants on *Low-carbon city pilots*, *Financing for low-carbon development*, and *Science, technology and innovation policy for low-carbon development* in 2015.

The publication that came out of this collaboration, **Low Carbon Development in China and India** was pre-launched at the 'Third Strategic Economic Dialogue' (SED) in Beijing on March 18, 2014. The finalised report and Chinese translation were released at the beginning of May, 2016. The report examines several major aspects of low carbon development – low carbon technologies, research and development (R&D) policies, and financing, in national and subnational contexts.

Innovation, financing, and sub-national actions

Innovation in low-carbon technologies, financing, and sub-national actions are seen as three key areas of focus that will enable China and India to achieve their emission reduction goals while also addressing poverty reduction priorities.

The Report examines the conditions for low carbon technology R&D in each country, addressed patent trends in both countries compared with global trends, policies, R&D frameworks and innovation chains, differing approaches to technical standards, and investment. It is therefore an area where China and India could make significant contributions. China's practices of incentivizing domestic manufacturing through the promotion of indigenous standards and the coordination between government and industry were highlighted as innovation policies that India could potentially adopt.

Financing mechanisms for low-carbon development are crucial, particularly in sub-national or urban areas, estimated to account for 50-80% of investment for GHG mitigation and up to 100% of investment for climate change adaptation. Indeed, a wide range of such financing mechanisms at the local level are being tested around the world (see table 2) including in both China and India. However, one of the biggest differences between the two countries is that China has adopted Emissions Trading Schemes as one of its primary carbon financial instruments. China currently has 7 pilot schemes and is due to launch its national ETS in 2017. India has several national and sub-national funds that support low-carbon development, and has experimented with different trading schemes in key sectors. India has also made use of market oriented innovations in the financing space such as green bonds and information tools such as Green-ex and Carbon-ex. Both countries have made great use of international financing such as the Clean Development Mechanism. In terms of sub-national initiatives, China is

implementing low carbon pilots for provinces and cities. India on the other hand has developed State Action Plans on Climate Change to guide actions at the state level.

Energy efficiency is another key area for collaboration, hence a

Table2 : Financial instruments employed by governments for low carbon development

| Type | Content |
|---------------------------------------|---------------------------------|
| Public finance and fiscal Instruments | Tax Revenue |
| | Fees |
| | Budgetary allocations |
| | Subsidies |
| | Green budgeting |
| | Fiscal transfer |
| Financing mechanisms | Special Funds / Institutions |
| | Markets and information |
| | Traditional finance innovations |
| | Risk Management |
| | Green credits |
| | Green bonds |
| | Economic incentives |
| International sources | Grants |
| | International climate finance |

Source : Based on China-India Low Carbon Study

new paper on Energy Efficiency Policy in China and India will be launched soon. Other areas of collaboration to be explored in future are on China and India's approaches to smart cities, natural resource management and south-south cooperation.

As the governments step up action to address climate change, both China and India can exchange lessons and experiences and also offer lessons to other countries around the world. The Report is a step in the direction to advance knowledge in the emerging area of low carbon development and offers issues for considerations and approaches that can be adopted and scaled up in both China and India.

Full Report link:

TERI-NCSC-CUFE-ZU-UNDP. 2016. *Low Carbon Development in China and India: Issues and Strategies*, available to download in [English](#) and [Chinese](#) at www.cn.undp.org.

Webinar links:

Science, Technology and Innovation

http://www.teriin.org/webinars/science_technology_feedback.php

Low carbon pilots

http://www.teriin.org/webinars/low_carbon_feedback.php

Financing on low carbon development

http://www.teriin.org/webinars/financing_low_carbon_feedback.php

Project website link:

<http://www.teriin.org/projects/loci>

Contact Information:

Climate Change Team
United Nations Development Programme
No.2 Liangmahe Nanlu, Beijing China 100600
Pstcc.cn@undp.org

¹ Based on the World Resources Institute's GHG data for 2012 available at <http://cait.wri.org> and population data from www.statista.com.

¹⁴ See the International Energy Association's most recent market report on coal. <http://www.iea.org/Textbase/npsum/MTCMR2015SUM.pdf> and BP Statistical Review of World Energy 2015 <https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2015/bp-statistical-review-of-world-energy-2015-full-report.pdf> for consumption data.

¹⁵ China and India's respective INDCs are available here <http://www4.unfccc.int/submissions/INDC>