

## 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 and 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. Though China's per capita income levels, energy consumption and progress on socio-economic indicators are higher than India, the two countries display similarities in trends of rising energy consumption and greenhouse gas emissions coupled with a decline in energy intensity figures. Both these 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. However, 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. 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. 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-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 carbon emission intensity targets into the five 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 and increasing forest cover.

#### *The initiative*

Based on this understanding of similarities and differences between China and India, in 2012, The Energy and Resources Institute of India (TERI), National Center for Climate Change Strategy and International Co-operation, Central University of Finance and Economics and Zhejiang University together 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 United Nations Development Programme after which the Norwegian Embassy provided support for the China component and Shakti Sustainable Energy Foundation provided support for the India component. The projects in both countries were steered by a high-level steering committee comprising representatives of the National Development and Reform Commission and Planning Commission.



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 spring of 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 book in Chinese and English were released at the beginning of May, 2016. The publication examined 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 book examined the conditions for research & development (R&D) of low carbon technologies in each country, looked at patent trends in both countries compared with global trends, R&D frameworks, policies and innovation chains, approaches to technical standards, and investment for R&D. It is therefore an area where China and India could make significant contributions. China's practices of incentivizing domestic manufacturing through the promotion of targeted demonstration & deployment were highlighted as innovation policies that India could potentially adopt.

Financing mechanisms for low-carbon development are crucial, particularly at the sub-national level. 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.

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

Source : Based on *China-India Low Carbon Study*

**Table 2 : Financial instruments employed by governments for low carbon development**

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

Source : Based on *China-India Low Carbon Study*

However, one of the biggest differences between the two countries is that China has adopted emissions trading scheme as one of its primary carbon financial instruments. China currently has 7 pilot schemes and is due to launch its national ETS in 2017. China has also deployed large scale fiscal stimulus for low carbon development and announced green credit guidelines. India has the National Clean Energy Fund to support low-carbon development, priority sector lending provisions for renewable energy and centre-state fiscal transfers based on environment performance. 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 provisions.

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.

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.

#### **Publication links:**

TERI-NCSC-CUFE-ZU-UNDP. 2016. *Low Carbon Development in China and India: Issues and Strategies* <http://www.teriin.org/projects/loci>. It is available in Chinese at [www.cn.undp.org](http://www.cn.undp.org)

#### **Webinar links:**

##### **Science, Technology and Innovation**

[http://www.teriin.org/webinars/science\\_technology\\_feedback.php](http://www.teriin.org/webinars/science_technology_feedback.php)

##### **Low carbon pilots**

[http://www.teriin.org/webinars/low\\_carbon\\_feedback.php](http://www.teriin.org/webinars/low_carbon_feedback.php)

##### **Financing on low carbon development**

[http://www.teriin.org/webinars/financing\\_low\\_carbon\\_feedback.php](http://www.teriin.org/webinars/financing_low_carbon_feedback.php)

#### **Project website link:**

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