

Discussion Paper

# Sub-national Actions on Low Carbon Development in India

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## **About the Project**

The study on low carbon development in India is directed towards developing specific strategies for low carbon development in crosscutting areas such as financing, technology and innovation policy, and subnational initiatives. By engaging with stakeholders, the project seeks to support policy incubation and development at both the national and sub-national level. Targeted policymaker engagement and advocacy will support design and adoption of new policies and programs based on findings from the study. The study is implemented by The Energy and Resources Institute and is supported by Shakti Sustainable Energy Foundation.

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## **Abstract**

It has been recognized that sub-national institutions could have a critical and far-reaching role in the process of transition to a low-carbon economy. It is imperative that a more decentralized, bottom-up climate policy making, resulting in actions customized to local contexts and needs, drives the country's response to climate change. It is intended that we debate on capability at the sub-national level in India by developing a metrics that include indices for socio-economic performance, low carbon development performance and carbon footprint. With regard to its implications for policy incubation in low carbon development and equity space, it must be emphasized that the LCD strategies considering the sub-national context of India must consider not only mitigation of carbon emissions; it must also factor in socio-economic capability and adaptive capacity. A policy framework for low carbon development strategies rooted in the 'co-benefits approach' framework that considers human development and socio-economic capability will be equitable. Proactive sub-national players must be rewarded and there should exist a knowledge based process that facilitates sharing of good practices to enable adaptation and incubation of relevant policies. With regard to policies for incubation, there are learnings from the experience of low carbon pilot initiatives in China. Low carbon development at the sub-national level—both at the state and city level—in India can benefit from the experience in China.

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# Sub-National Actions on Low Carbon Development in India

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## 1. Introduction

In June 2008, India launched its National Action Plan on Climate Change (NAPCC) that encompasses a multi-pronged, long-term and integrated framework for addressing climate change as a core development issue. In its eight missions, the NAPCC proposes an extensive range of measures focusing on renewable energy, energy efficiency, clean technologies, public transport, resource efficiency, afforestation/reforestation, tax incentives and research, and generation of strategic knowledge. The Ministry of Environment, Forests & Climate Change (MoEFCC) coordinates the implementation of the NAPCC through its various missions which are nodalized by the respective administrative ministries.

A decentralized bottom up approach is hence essential for the government to realize the vision of climate justice. It has been recognized that sub-national institutions could have a critical and far-reaching role in the process of transition to a low-carbon economy. According to UNDP (2010), around 50–80% of the investments for GHG mitigation (and up to 100% for climate change adaptation) happen at the sub-national and local levels. Regional and local governments lead<sup>1</sup> the implementation of policies, programmes and fiscal instruments ‘in the areas of generation, supply and distribution of electricity, the regulation of the built environment, waste management, transport and land-use planning’. Engaging sub-national and local actors in climate action could promote cross-sector policy interventions and create ‘role models’ which could be replicated/up-scaled at the domestic and global levels. In the context of the international climate policy and discourse, the Cancun Agreement (COP 16) for the first time formally recognized<sup>2</sup> the indispensable role of local and sub-national governments as ‘government stakeholders’ in global climate action.

The National Institution for Transforming India has a mandate to foster cooperative federalism through structured support initiatives and mechanisms with the States on a continuous basis, recognizing that strong States make a strong nation. India is a federal country with 28 states and 7 union territories. According to the federal system of the country, the responsibilities and areas of jurisdiction of the centre and the state governments are delineated through the Union List and the State List, respectively, elaborated in the Seventh Schedule of the Constitution of India<sup>3</sup>. This demarcation of responsibilities plays an important role in the context of environment federalism and climate policy in the country. The Union List consists of 97 subjects over which the national legislator has exclusive powers, some of which are relevant in the context of climate change. These include trade representation, United Nations organizations, agreements and conventions with foreign countries, atomic power, mineral and oil resources, and control of industries. Moreover, given the international context of the problem, and the constitutional proficiency of the union

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<sup>1</sup>The Climate Group (2009).

<sup>2</sup>Cancun Agreement, Decision 1/CP.16 on “Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA)”.

<sup>3</sup>Seventh Schedule (Article 246) of the Indian Constitution, [http://lawmin.nic.in/olwing/coi/coi-english/Const.Pock%20Pg.Rom8Fsss\(35\).pdf](http://lawmin.nic.in/olwing/coi/coi-english/Const.Pock%20Pg.Rom8Fsss(35).pdf).

government for international agreements and treaties, the primary responsibility for climate change agreements lies with the union government (Jørgensen 2011).

On the other hand, the State List contains 66 subjects including public health and sanitation, agriculture, water, fisheries, mines and land use—areas which have a direct bearing on natural resources and climate change. These subjects are under the state government's exclusive jurisdiction. In addition, sectors such as selected industries and transport, which are critical in the context of climate policy making by virtue of being energy- and emissions-intensive in nature, are also the constituents of the State List. Energy appears in the Concurrent List involving both levels of government (Jorgensen 2011). Thus, this clear definition of domains for operation of the central and state legislators and moreover, the nature of subjects covered under the State List clearly highlights the potential role and impact state actors have in designing and executing climate policy for the region (Mishra et al 2011). Additionally, the states are responsible for implementing the policies and programmes framed by the central government. However, the degree and urgency of the climate change challenge necessitates enhanced roles for state actors to move beyond mere 'executers' to 'initiators and innovators'. Taking a bottom-up approach and allowing active participation of states in the process of climate policy making could transform states into 'laboratories of invention' for technological and regulatory innovation (Kashwan 2007).

Further, in light of the wide socio-economic and climate-geographic variations across different regions, the relevance of active involvement of states in policy formulation increases manifold. Besides, the states also differ in terms of mitigation potential (available opportunities to abate/avoid GHGs) and capacity (financial, technological, know-how and awareness). Thus, it is imperative that a more decentralized, bottom-up climate policy making, resulting in actions customized to local contexts and needs, drives the country's response to climate change (Kashwan 2007, Burtraw and Shobe 2009).

## 2. State Action Plan on Climate Change: Process, Actors and Status

As a corollary to NAPCC, in August 2009, the Prime Minister of India directed all the states to formulate their respective State Action Plan on Climate Change (SAPCC), guided by and consistent with the structure and strategies of the NAPCC. The individual SAPCCs should lay out sector-specific as well as cross-sector time-bound priority actions in light of state-specific risks, impacts and opportunities besides prioritizing areas for research and policy action in response to current and future vulnerabilities and projected impacts. The SAPCCs should also list indicative budgetary requirements, supplemented with details of the necessary institutional and policy infrastructure to support the operationalization of actions.

As the first step, MoEFCC, the coordinating agency for implementation of the NAPCC, developed a common framework with inputs from various multilateral and bilateral agencies like GIZ, UNDP, World Bank, ADB and DFID with an objective to decentralize the NAPCC objectives into local context (MoEF 2010). Besides harmonizing national and state level policies and actions with regional and site-specific variations, the common framework was also expected to enable proper coordination of the process of preparation of SAPCCs and its subsequent implementation under varied regional and local contexts.

Almost all the states (at various stages of development of SAPCCs) have adopted a consultative approach, although there is considerable variation among states in terms of the form and extent of stakeholders' participation undertaken/proposed. As in the case of any policy instrument, implementation of SAPCCs also requires suitable institutional arrangements. In line with this requirement, various states have come up with different institutional arrangements ranging from Climate Change Cells in a nodal department to a full-fledged Department of Climate Change as in the case of the State of Gujarat.

At the state level, the State Steering Committee, State Advisory Group and Core Agency are the three pillars for developing the SAPCC. Their responsibilities and roles are outlined in Figure 1. After the SAPCC is prepared, the final endorsement and approval of the SAPCC is to be undertaken by the National Steering Committee (NSC) in the MoEFCC.

At the central level, the MoEFCC follows a two-stage process for granting final endorsement to the SAPCCs. The Ministry has constituted an Expert Committee (EC) with a mandate to review the draft document in line with the common framework and objectives of the NAPCC. In the first stage, the draft report received from the state agencies is reviewed by the EC. At the second stage, on receipt of the revised SAPCC incorporating suggestions/recommendations made by the EC, the National Steering Committee (NSC) on Climate Change considers and endorses the SAPCC.

The challenge of climate change is multi-dimensional and cannot be addressed in isolation by one department; it requires active inter-departmental cooperation. Generally, the preparation of SAPCCs in India has witnessed line departments providing primary inputs to the nodal department, which in consultation with technical experts has sought to develop a coherent policy document. Cross-department integration of strategies has been attempted in varying ways: while in some states, presentation of the SAPCC before a high-level Committee of

Secretaries has enabled quick iteration and consensus-building, in others, the process<sup>4</sup> has been tedious and often superficial.

**Figure 1:** Process of Preparation of SAPCCs

<p><b>National Steering Committee on Climate Change (NSCCC)</b></p>	<p>The NSCCC has been set up under the chairmanship of Secretary, MoEFCC with Secretaries of various National Ministries as members to consider and endorse the SAPCC.</p>
<p><b>Expert Committee (EC)</b></p>	<p>EC reviews the draft documents and provides suggestions/ recommendations to the States for incorporation in their final SAPCC reports.</p>
<p><b>State Steering Committee (SSC)</b></p>	<p>SSC would be constituted under the chairmanship of Chief Secretary of the State and would also comprise representatives of relevant State government departments, academicians and NGOs. SSC would provide overall guidance, supervision and coordination for the preparation of SAPCC.</p>
<p><b>State Advisory Group (SAG)</b></p>	<p>SAG would be responsible for reviewing the technical quality of data and robustness of analysis apart from the feasibility of recommendations of the SAPCC.</p>
<p><b>Core Agency</b></p>	<p>Core Agency/ Agencies would be designated by the State government for actual preparation of SAPCC.</p>

By the end of the year 2014, all Indian states had prepared at least a draft of the action plan. As of August 2015, the NSCC at the MoEFCC has endorsed 19 state action plans including Andaman and Nicobar, Andhra Pradesh, Arunachal Pradesh, Chhattisgarh, Himachal Pradesh, Jammu and Kashmir, Lakshadweep, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Puducherry, Punjab, Rajasthan, Sikkim, Tripura and West Bengal. Three SAPCCs (Haryana, Jharkhand and Karnataka) have been considered by the EC. As the next step, the SAPCCs endorsed by the NSCC will be considered for integration in the respective state annual development plans and will seek financial support through various sources such as the Niti Ayog, MoEFCC and other national ministries and agencies.

The various SAPCCs propose a host of strategies that would help the states achieve their adaptation and mitigation objectives. The common rules followed by the various states in formulating SAPCCs include ‘principles of territorial approach to climate change, sub-national planning, building capacities for vulnerability assessment, and identifying investment opportunities based on state priorities’.

<sup>4</sup>Based on TERI’s experience in the SAPCC preparation process; TERI was engaged in the SAPCC preparation of states like Rajasthan, Assam, Karnataka and Gujarat.

### 3. Metrics for Socio-economic Considerations and Low Carbon Development

Notions around equity have been anchored on the principles of ‘equal rights’, ‘polluter pays’ and ‘equal per capita emissions’ (Ghosh 1993; Baer et al. 2000; Ghosh 2013). In his discussion on equity, Ghosh (2013) leaves three issues open for debate:

- Articulation of capability
- Boundaries for considering greenhouse gas emissions
- Timing for considering historical responsibility

Ambitious targets for human development in the post-2015 development agenda need to embed a strong focus on moral concepts such as equity (Melamed and Samman 2013). According to Sen (1987: 36), capabilities refer to notions of freedom and opportunities in life. In line with this, the metrics developed for socio-economic capability include elements around opportunities that result from performances linked to public infrastructure, income, education and empowerment of local institutions.

In this section, we will first see the key indicators relevant to emissions and low carbon development for the world, OECD, India and China. We then attempt to articulate ‘capability’ in the context of socio-economic and low carbon development performance for the states in India.

Table 1 depicts population and key emissions indicators for the world, China, India and OECD members for the year 2011. It can be seen from the table that according to the latest available data by the World Development Indicators, the world average for per capita CO<sub>2</sub> emissions is 4.94 tonnes with China’s per capita average exceeding the world average while India’s per capita emissions lower than the global average. Both countries however had lower per capita emissions compared to the OECD members. It has also been analysed that net emission transfers via international trade is a significant factor in explaining the rise in emissions in countries including China (Peters and Hertwich 2008; Peters et al. 2011).

**Table 1:** Emissions Indicators: World, China and India (2011)

Region/country	Population (million)	CO <sub>2</sub> emissions (Mt)	Per capita CO <sub>2</sub> emissions (tonnes)
World	7007	34649	4.94
China	1344	9020	6.71
India	1247	2074	1.66
OECD members	1249	12376	9.91

*Source:* World Development Indicators

It is intended that we look at capability at the sub-national level in India by developing a metrics that include indices for socio-economic performance, low carbon development performance and carbon footprint. Table 2 summarizes the indicators used in arriving at socio-economic performance, low carbon development performance and carbon footprint indices for the 27 states in India. Socio-economic performance index is based on poverty, literacy, public infrastructure (electrification and health) and capacity of local institutions to implement social programmes. For low carbon development (LCD) performance index, we

take performance in interventions related to grid and off-grid clean energy and also the change in forest cover at the state level. For carbon footprint index at the sub-national level, per capita emissions is not used as states with lower population may also be the states that are not faring well in terms of socio-economic indicators.

**Table 2:** Indicators and Data Sources used for Developing Indices

Index category	Indicators	Basic data source
Socio-economic performance index	Health	Average population served per government bed; Central Bureau of Health Intelligence; National Health Profile of India (2011)
	Institutional capacity	Total availability of funds and expenditure at Panchayat level for execution of MG-NREGS; nrega.nic.in
	Non-BPL population	Ministry of Rural Development; available from <a href="http://pib.nic.in/newsite/erelease.aspx?relid=49731">http://pib.nic.in/newsite/erelease.aspx?relid=49731</a>
	Female literacy rates	Census 2011
	Electrification	Ministry of Power; <a href="http://rggvy.gov.in/rggvy/rggvyportal/electrification_status.jsp">http://rggvy.gov.in/rggvy/rggvyportal/electrification_status.jsp</a>
Low carbon development (LCD) performance index	Grid: Solar RPO performance	Solar RPO requirement and compliance for 2012. 13; available from <a href="http://www.mnre.gov.in/information/solar-rpo/">http://www.mnre.gov.in/information/solar-rpo/</a>
	Off-grid: Biogas	National biogas programme; basic data from <a href="http://www.mnre.gov.in/related-links/decentralized-systems/schems-2">http://www.mnre.gov.in/related-links/decentralized-systems/schems-2</a>
	Forest cover	Forest Survey of India (2011)
Carbon footprint index	Difference between CO <sub>2</sub> emissions and storage in Gg	Ramachandra, T. V. and Shwetmala (2012). Decentralised carbon footprint analysis for opting climate change mitigation strategies in India. <i>Renewable and Sustainable Energy Reviews</i> , 16(8), 5820. 5833.

Further to identifying and collecting basic data, computation and standardization of indicator values is done so that it falls in the range of 0–1. This procedure makes the respective values of the chosen indicators (as mentioned in Table 2) unitless so that indicators are comparable for construction of an index. In the index, the best performer hence gets a value of 1, while the worst performer gets a value of 0. Moreover, all values become uni-directional.

The standardization procedure using  $x$  as a variable is as follows:

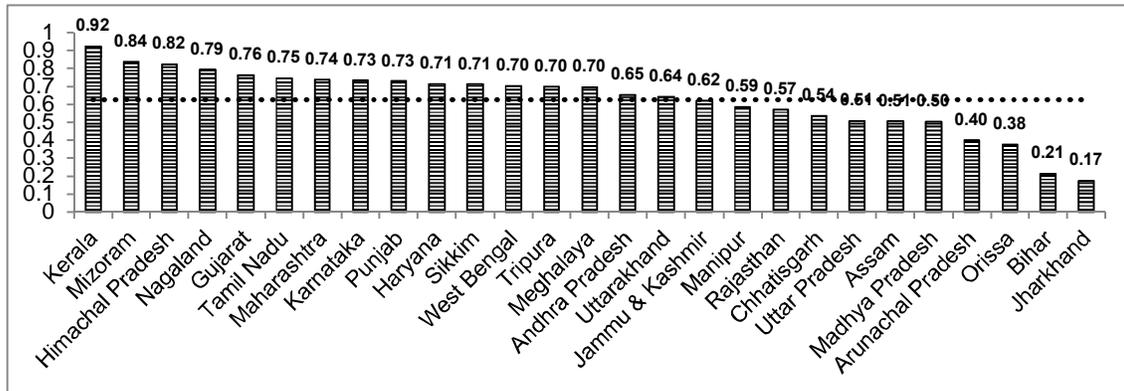
$$x - \text{index} = [x - \min(x)] / [\max(x) - \min(x)]$$

Here  $\min(x)$  and  $\max(x)$  were the lowest and highest values for the variable  $x$ . The scores received by each state with respect to each indicator are then averaged. These are then depicted graphically in the following sections.

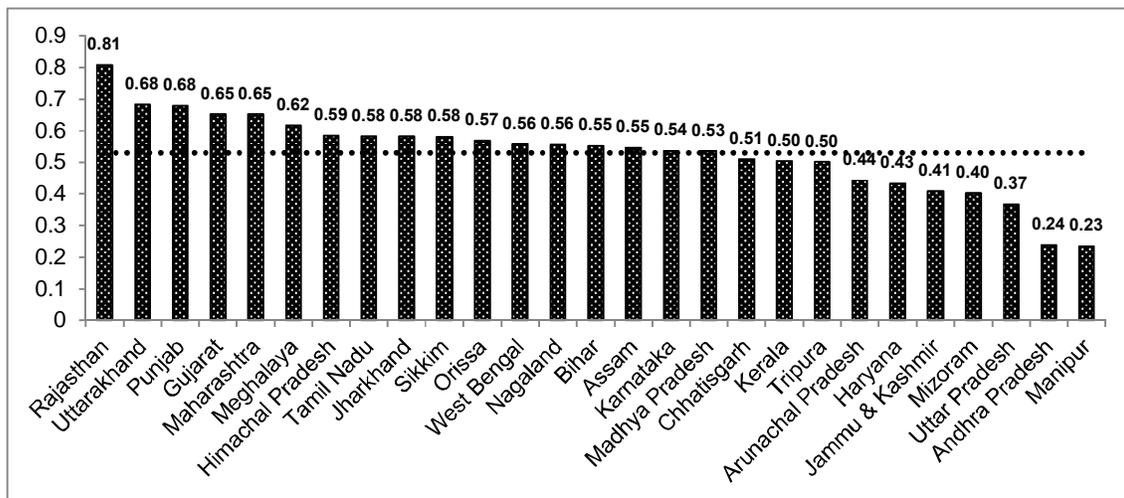
Figure 2 depicts the socio-economic performance indices for 27 states in India. Among the 14 major states – Kerala, Gujarat, Tamil Nadu, Maharashtra and Karnataka fare well in terms of socio-economic indicators.

Figure 3 depicts the low carbon development (LCD) performance indices for 27 states in India. Among the 14 major states – Rajasthan, Punjab, Gujarat, Tamil Nadu and Odisha fare well in terms of LCD capacity indicators.

**Figure 2: Socio-economic Performance Indices for 27 States of India**



**Figure 3: LCD Capacity Indices for 27 States of India**



**Figure 4: Carbon Footprint Indices for 27 States of India**

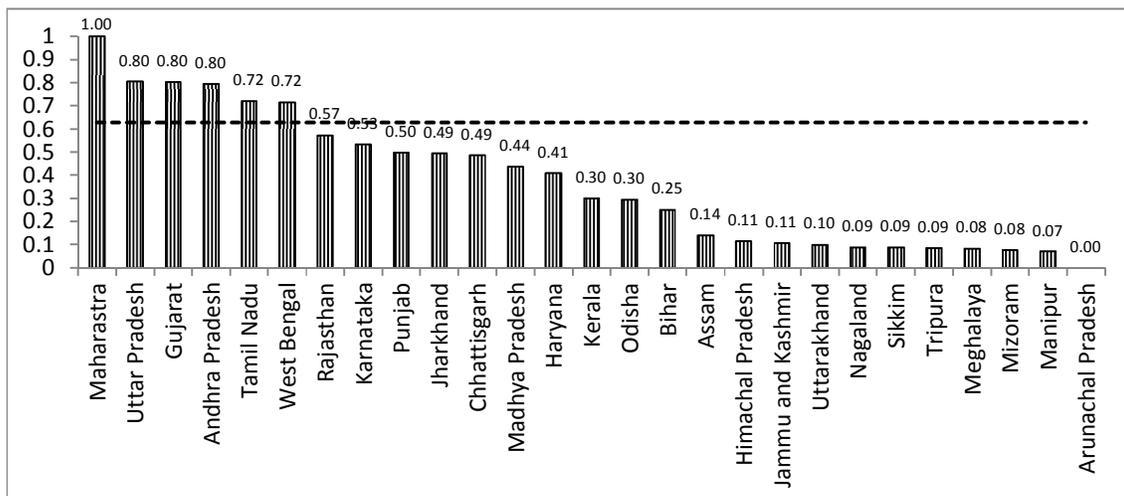


Figure 4 depicts the carbon footprint indices for 27 states in India. Among the 14 major states – Maharashtra, Uttar Pradesh, Gujarat, Andhra Pradesh and Tamil Nadu have higher carbon footprints; this is also owing to factors such as higher industrialization and demographics

**Table 3:** Indices for LCD Performance, Carbon Footprint and Socio-economic Performance for 14 Major States in India

State	LCD capacity index		Carbon footprint index		Adaptive capacity index	
	Standardized scores	Rank	Standardized scores	Rank	Standardized scores	Rank
Rajasthan	0.8086	1	0.5730	7	0.5690	10
Punjab	0.6791	2	0.4974	9	0.7286	6
Gujarat	0.6523	3	0.8033	3	0.7632	2
Maharashtra	0.6521	4	1.0000	1	0.7375	4
Tamil Nadu	0.5832	5	0.7199	5	0.7470	3
Odisha	0.5682	6	0.2962	13	0.3770	13
West Bengal	0.5578	7	0.7151	6	0.7025	8
Bihar	0.5526	8	0.2512	14	0.2121	14
Karnataka	0.5360	9	0.5322	8	0.7334	5
Madhya Pradesh	0.5344	10	0.4365	10	0.5045	12
Kerala	0.5044	11	0.3009	12	0.9244	1
Haryana	0.4333	12	0.4078	11	0.7143	7
Uttar Pradesh	0.3672	13	0.8039	2	0.5068	11
Andhra Pradesh	0.2382	14	0.7951	4	0.6538	9

Table 3 depicts the composite index score values for the 14 major states<sup>5</sup> with their respective ranks. It is interesting to observe that although Rajasthan ranks first in terms of LCD performance, it ranks in the bottom five in terms of socio-economic performance. This implies that adaptive capacity could be weaker for the state. Similarly, while Kerala ranks first in terms of socio-economic performance, it ranks lower in terms of LCD performance. LCD performance of a state also depends on policy approaches by the state government and existing, potential resource endowments of respective states. It is seen that the states of Bihar and Odisha which rank low in terms of socio-economic performance and also have low carbon footprints still rank higher up in terms of LCD performance and there can be optimism in terms of states choosing alternate development paths.

With regard to its implications for policy incubation in low carbon development and equity space, it must be emphasized that the LCD strategies considering the sub-national context of India must consider not only mitigation of carbon emissions; it must also factor in socio-economic capability and adaptive capacity. A policy framework for low carbon development strategies rooted in the ‘co-benefits approach’ framework that considers human development and socio-economic capability will be equitable. Proactive sub-national players must be rewarded and there should exist a knowledge based process that facilitates sharing of good practices to enable adaptation and incubation of relevant policies.

<sup>5</sup>The 14 major states are based on the achieved growth of the states of India in terms of their gross state domestic product during the pre (1980–81 to 1990–91) and post-reform period (1991–92 to 1998–99) in India.

## 4. China's Low Carbon Pilots

In July 2010, the National Development and Reforms Council initiated a low carbon pilot province and city program including five provinces (Yunnan, Guangdong, Hubei, Shaanxi, and Liaoning) and eight cities (Tianjin, Baoding, Hangzhou, Chongqing, Nanchang, Guiyang, Xiamen and Shenzhen) across the country. In November 2012, another 29 provinces and cities (see above table) have been selected as the second batch of low-carbon pilots. All these pilot cities and provinces occupy 57% of China's GDP, 42% of China's population and 56% of energy related CO2 emissions.

Details of the two batches of low carbon pilots are shown in the following table (Table 4).

**Table 4:** Low Carbon Pilots in China

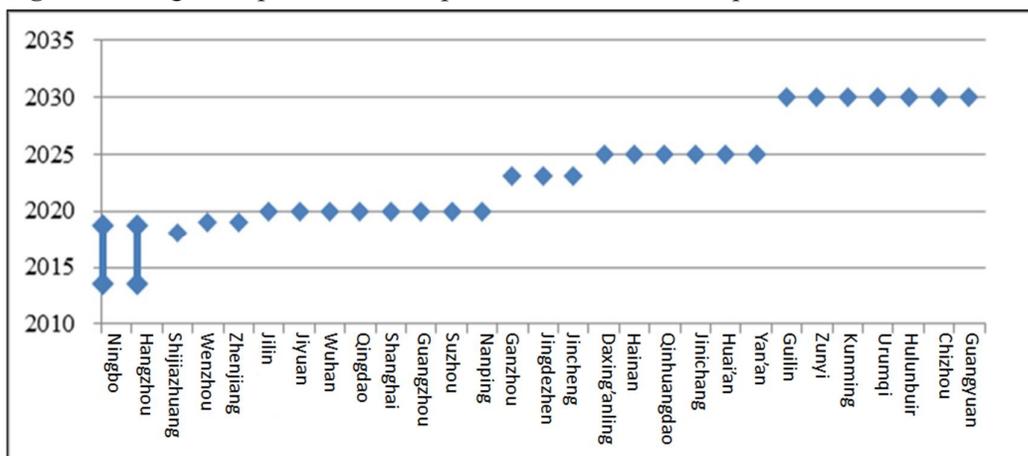
Low carbon pilot batch	Year	Provinces	Cities
Batch 1	2010	Guangdong, Liaoning, Hubei, Shaanxi, Yunnan	Tianjin, Chongqing, Shenzhen, Xiamen, Hangzhou, Nanchang, Guiyang, Baoding
Batch 2	2012	Hainan	Beijing, Shanghai, Shijiazhuang, Qinhuangdao, Jincheng, Hulunbair, Jilin, Daxinganling, Suzhou, Huai'an, Zhenjiang, Ningbo, Wenzhou, Chizhou, Nanping, Jingdezhen, Ganzhou, Qingdao, Jiyuan, Wuhan, Guangzhou, Guilin, Guangyuan, Zunyi, Kunming, Yan'an, Jinchang, Urumqi

*Source: National Center for Climate Change Strategy and International Cooperation*

The nominated pilot cities and provinces were expected to undertake the following tasks

- Develop and propose a low-carbon development plan
- Formulate supportive policies for low-carbon green growth
- Establishing a low-carbon industrial system
- Establishing a greenhouse gas emission statistics and data management system
- Encouraging low carbon lifestyle and consumption patterns
- Capacity development in the cities on data of GHG emissions.

**Figure 5:** Targets of pilot cities and provinces for emissions peak



*Source: National Center for Climate Change Strategy and International Cooperation*

Of the first five pilot provinces and eight pilot cities, the key targets are carbon intensity and energy intensity. Shenzhen City is the first to propose to arrive at an emissions peak between 2017 and 2020. The second batch of 29 low carbon pilot provinces and cities has announced to curb the total amount of carbon emissions or the peak year for carbon emissions. Cities were given flexibility to determine their targets and sectors. See figure 5 for targets of pilot cities.

## 5. Ways Forward

The State Action Plan on Climate Change (SAPCC) which is aligned around the National Action Plan on Climate Change (NAPCC), is well placed to serve as a development tool. Analytics which form the basis of SAPCC recommendations include current and future development scenarios and likely impact of climate change; and identify vulnerable areas, sectors and communities and their associated risks. In the state-specific SAPCCs, each state has come out with its own agenda of activities to address issues related to climate change in specific sectors in a manner that these activities also align with the eight missions listed under the National Action Plan on Climate Change (NAPCC). However, the implementation of the SAPCCs for the states has not yet taken place—it is perceived that the progress of states towards achieving the goals listed in SAPCCs is likely to face challenges due to lack of adequate financing available for specific targets.

Out of the eight national missions under the NAPCCs accruing to the National Mission for Sustainable Agriculture (NMSA), Green India Mission (GIM); and National Mission for Enhanced Energy Efficiency (NMEEE), there is better availability of funding to the state for sectors like agriculture, forestry, and energy. However, for other sectors including renewable energy and infrastructure (buildings) which are crucial for low carbon development at the state level, there is absence of adequate financing. To be better able to implement the SAPCCs, synergies between central expenditure and state finances and actions needs to be explored.

The lack of adequate financing for the well-written SAPCCs also highlights the need for appropriate institutional mechanisms which can support centre–state disbursements of public funds. Especially for sectors like improving energy efficiency and promoting renewable energy, involvement of private sector funding needs to be encouraged.

This would also require states to prioritize their actions depending on the objectives, which may include economic gains, social equity, and reduction in GHG emissions. Prioritization and institutional mechanisms would help channelize better funds towards the specific objectives around the SAPCC process. Policy actors including the Niti Aayog, Ministry of Environment, Forest and Climate Change and state governments can be engaged. Funds for state-specific low carbon development initiatives that can be implemented alongside SAPCC related processes.

With regard to policies for incubation, there are learnings from the experience of low carbon pilot initiatives in China. Low carbon development at the sub-national level—both at the state and city level—in India can benefit from international experiences. In this regard, inspirations from other sub-national models around the world become relevant. The previous section discussed the low carbon pilots of China.

The metrics discussed could be strengthened to help in informing equitable low carbon development strategies. To strengthen actions at the sub-national level, a deeper engagement with stakeholders is required for understanding how sub-national initiatives can be further strengthened on the basis of other models around the world and through knowledge based processes.

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