

# Local Governance Pathways to Decarbonization in China and India

Bruce Gilley\*

## Abstract

Reducing greenhouse gas emissions in the world's two largest countries requires feasible governance pathways that integrate politics, policy and administration. Using examples of successful mitigation at the local level in China (Guangzhou) and India (Gujarat), this article identifies integrated governance solutions that work in both cases through different types of linkages. In China, it is mainly intra-governmental linkages, while in India it is mainly state–society linkages. In neither case do international negotiations concerning emissions targets have significant effects, while national frameworks have only marginal effects. Approaching the problem in this comparative manner helps to clarify how greenhouse gas governance operates in each country, the lessons for central–local environmental relations, and the implications for international assistance.

**Keywords:** greenhouse gas emissions; carbon emissions; climate change mitigation; governance; policy; local government; public administration

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In 2015, China and India represented approximately one third of global greenhouse gas (GHG) emissions, up from one fifth in the year 2000. The two countries accounted for two thirds of the global increase in energy use between 2000 and 2012.<sup>1</sup> On current trends, they will account for about half of global greenhouse gas emissions by 2050.<sup>2</sup> In order to attain the level of greenhouse gas concentrations consistent with only a two degree increase in global temperatures over pre-industrial levels, China and India would have to stop the absolute rise in their emissions today and the rest of the world would need to reduce its emissions by 15 per cent every five years (or 3.2 per cent per year) until 2050. In other words, the “deep decarbonization” required to limit the risk of catastrophic climate change requires super-human efforts both by China and India as well as by rich countries. Climate change research accordingly has shifted direction to focus on China and India as key developing countries whose emissions trajectories will critically determine global outcomes.<sup>3</sup>

\* Portland State University. Email: [gilleyb@pdx.edu](mailto:gilleyb@pdx.edu).

1 Wang and Li 2016.

2 Hof et al. 2015; Joint Program on the Science and Policy of Global Change 2014, 8.

3 Shukla et al. 2006.

For the most part, this research has been centred on questions of policy – the sorts of policies that could in their technical and economic properties deliver the necessary sharp reductions in emissions in China and India. Another, usually separate, strand of this research concerns the international political positions of the two nations. Yet neither research agenda adequately addresses the ways in which feasible policies or international agreements find traction in actual outcomes through supportive political and administrative conditions at the local level. In other words, neither approach solves the governance challenge of greenhouse gas mitigation. These “pure-policy” approaches, write Harrison and Kostka, “underplay the political challenge of building the domestic support and forms of capacity that are needed to promote and sustain mitigation measures.”<sup>4</sup>

This article will seek to identify feasible pathways to effective governance of greenhouse gas emissions using comparative case studies of the city of Guangzhou in China and the state of Gujarat in India. The cases are used to identify different forms of governance through which actual mitigation outcomes have been achieved. It concludes with a discussion of implications for central–local environmental governance and for international support of mitigation efforts.

### The Need for Integrated Governance

Politics, policy and administration operate with some degree of functional autonomy in highly developed nations: problems are identified, policy options are generated, politicians decide among them, and administrators put them into effect. But in developing countries, these processes are more closely interdependent.<sup>5</sup> Political and administrative constraints narrow the range of feasible policy options to a greater degree than in more institutionalized settings. By the same token, new policies can reshape political and administrative conditions in more disjunctive ways. This interdependence is particularly strong in the case of greenhouse gas governance because it is a new policy area characterized by highly uninstitutionalized politics, policy and administration.<sup>6</sup>

The close interdependence of politics, policy and administration means that policy approaches often fail when they are not linked to necessary political and administrative supports. China, for instance, began piloting regional carbon markets in 2011 and planned to initiate a single national market in 2016. But the effort has been hampered on the political side by a lack of agreement on what sectors to include, the growth of absolute emissions for these sectors, and the allocation of the resulting emission rights. In 2013, a quarter of the 242 mandated companies in Guangdong province simply refused to buy carbon permits on the grounds that the provincial scheme was unfair, a problem of state-owned

4 Harrison and Kostka 2014, 451.

5 Grindle and Thomas 1991.

6 Compston 2010; Yi and Feiock 2014.

enterprise resistance that Eaton and Kostka describe elsewhere in this special section.<sup>7</sup> The carbon market has been hampered on the administrative side by a weak legal infrastructure, trading rules, and monitoring and enforcement.<sup>8</sup> In 2014, He Yi, the head of carbon trading for one of China's largest power producers, Huaneng Power, criticized the government's roll-out of carbon markets as no better than its early attempt to build stock markets in the 1980s, which was characterized by wild price swings, artificial scarcities and constant policy changes.<sup>9</sup>

In India, meanwhile, the seemingly good idea of providing a government subsidy for installations of rooftop solar panels in government buildings, large commercial establishments and rural residences was a slow-moving failure. The government announced in early 2015 that it was abandoning the policy at the national level. Budgetary uncertainties caused by political disagreements and delays and staffing costs linked to a lack of administrative capacity meant that companies offering the subsidized installations were usually charging *more* to customers than companies offering unsubsidized installations because of the business costs of seeking reimbursements. "The government can do more good by removing the subsidy altogether," Pradeep Palleli of Zolt Energy, a Hyderabad installer, concluded.<sup>10</sup>

These examples are emblematic of more generalized failures of greenhouse gas mitigation policies in China and India caused by an inability to find integrated governance solutions. Governance is usually understood as a process of ordered rule and collective action characterized by interactions among multiple actors and institutions.<sup>11</sup> Harrison and Kostka have described the current greenhouse gas governance models in the two places as "state signalling" in the case of China and "market plus" in the case of India. In the former, "the national government provides guidelines and concrete energy efficiency targets for local governments to pursue ... Signals are accompanied by concrete targets and incentives for local officials." In the latter approach, governance "draws on the high price of energy to incentivize energy users to improve their energy efficiency and thereby make savings on their energy bills."<sup>12</sup>

While "state signalling" and "market plus" are accurate *descriptions* of the approaches taken in China and India, and while these existing approaches must be the starting point for any discussion of how to do better, neither practice is at present delivering the magnitude of greenhouse gas reductions needed for these two countries. From an integrated governance approach, these failures are a result of an inability of these practices to provide a pathway that combines effective politics, policy, and administration.

7 Chen and Reklef 2014; Eaton and Kostka 2017.

8 Han et al. 2012; Liu et al. 2015.

9 Sina Finance 2014.

10 Woods 2014.

11 Stoker 1998.

12 Harrison and Kostka 2014, 458.

In the case of China, the command-and-control approach of “state signalling” delivers sub-optimal outcomes because it undermines local political support, narrows policy choices and disincentivizes administrative action.<sup>13</sup> These problems are magnified in the case of greenhouse gas mitigation because of the higher political stakes (interests), the more complex nature of the policy issues, and the resulting challenges of building capacity for a relatively new policy area. A Lawrence Berkeley National Laboratory report notes that “a strong administrative team is needed”<sup>14</sup> for cities to lead decarbonization in China. But so far there is little research into what this entails.

As the carbon market example shows, top-down state signalling is sub-optimal even within the politics space. The Asian Development Bank identifies no fewer than 28 separate dimensions of state signalling for low carbon development contained within the central government’s 12th Five-Year Plan (2011–2015).<sup>15</sup> Meanwhile, competing state signals for political stability or economic growth may dominate signals for low carbon development depending on time horizons and personal political networks.

Even if these political dimensions are resolved, the state signalling approach in China does not create incentives for the breadth of policy choices (and policy instrument choices) needed to achieve significant mitigation, as Zhang and colleagues show is the case for energy intensity targets<sup>16</sup> and as Wong and Karplus show for air pollution in this special section.<sup>17</sup> It also tends to reinforce rather than resolve the problem of weak administrative systems. A separate study by the Lawrence Berkeley Laboratory in 2013 noted that state signalling was hampered by “a lack of explicit definition for low-carbon city; complexity and confusion resulting from several parallel programs; and insufficient supporting policies and market-based instruments.”<sup>18</sup> This is exacerbated by the lack of fiscal resources as the central government provides very little fiscal support for mitigation.<sup>19</sup> Stock markets were win-win and administratively simple but decarbonization is win-lose and administratively complex.

In the case of India, as the solar subsidies example shows, the bottom-up “market plus” approach is also sub-optimal within each of the three spaces and across them. In politics, it does not create strong enough incentives for local political will to maintain a consistent policy (especially budgetary allocations) across electoral cycles. Administratively, the market-plus approach provides insufficient attention to improving regulative efficiency and relies too heavily on the offices of the national government, local social movements, or specialized courts to

13 Gilley 2012; Kostka 2014; Zhao 2011, 15.

14 Ohshita et al. 2015, 8.

15 Ishii and Muzones 2013.

16 Zhang, Feng and Zhao 2015.

17 Wong and Karplus 2017.

18 Khanna, Fridley and Hong 2013, 649.

19 Li and Ma 2013.

ensure implementation.<sup>20</sup> In this case, it is market incentives rather than national plans that suffer from weak local buy-in.

In other words, the “state signalling” and “market plus” approaches leave open the question of what characterizes the places in China and India that *have* done better. How can we characterize the governance systems at work in *these* places?

One starting point for such research is to scale down to the sub-national level because of growing evidence globally that local governments are more likely to provide integrated governance solutions to greenhouse gas mitigation than national governments.<sup>21</sup> Local governments can more easily unlock the political co-benefits of mitigation such as green branding, air quality, quality of life, inward investment, first-mover advantage and accelerated depreciation of old infrastructure (“building back better”). Local public administration tends to be more collaborative given its smaller scale, which in a relatively uninstitutionalized area such as greenhouse gas mitigation allows for effective service delivery.

This article will consider two cases of successful sub-national mitigation, the city of Guangzhou in China and the state of Gujarat in India. These cases are chosen because they are outliers, having decarbonized faster than other sub-national regions. They have comparable levels of economic development, comparable vulnerability to climate change, and are roughly similar in terms of their total emissions. This article draws upon existing scholarly research, media reports and official documents to make sense of governance in these two places by reconstructing existing facts to create a plausible explanation of known outcomes. The aim is to direct attention to how the disparate fields of policy, politics and administration interact in ways that explain success in these cases.

## The Case of Guangzhou

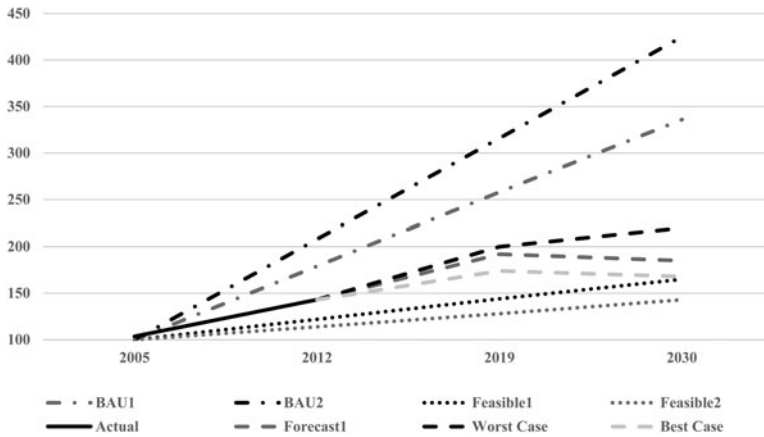
Guangzhou is China’s third-largest city, containing somewhere between 11 and 13 million people in 2014, depending on which official statistics and urban definitions are used. It is part of the 56-million person Pearl River Delta region and is the capital city of the 105-million person province of Guangdong. As a political and economic centre of one China’s wealthiest province, Guangzhou emits a significant amount of greenhouse gases. The city’s emissions in 2012 were larger than those of Belgium and nearly as much as those of Pakistan.<sup>22</sup>

Guangzhou can be called a success story because it has slowed both the absolute rate of emissions growth and the rate relative to business-as-usual scenarios calculated in the mid-2000s (see [Figure 1](#)). Two separate studies found that around 2005, Guangzhou’s emissions (CO<sub>2</sub> only, which accounted for 85 per cent of China’s total GHG emissions in 2012) were likely to rise from 100 million tonnes per year to somewhere between 325 and 425 million tonnes per year by

20 Agoramoorthy 2012.

21 Bulkeley and Betsill 2003; Hoornweg 2011; United Nations Human Settlements Programme 2011.

22 World Resources Institute 2015; Yu et al. 2014.

Figure 1: CO<sub>2</sub> Emissions in Guangzhou (million tonnes)

Sources:

BAU1/Feasible 1: Zhao and Matsuoka 2013; BAU2/Feasible2: Wang, Cheng and Zhao 2013; Actual: Yu, Ge and Li 2014; Forecast1: Xia and Luan 2014. Worst Case/Best Case: Sun, Yu, and Liao 2016.

2030 without policy changes. Both of those studies argued that with best efforts, that trend line could be bent downwards to a trajectory leading to about 150 million tonnes.<sup>23</sup> Data from 2012 and 2013 suggest the city has indeed come close to that “best scenario” trajectory.<sup>24</sup> In 2012, Guangzhou’s total emissions actually declined for the first time by about 3 per cent.<sup>25</sup> As a result, Guangzhou’s share of China’s total emissions (again CO<sub>2</sub> only) fell from 1.4 per cent in 2005 to 0.6 per cent in 2012. Guangzhou University’s Development Institute estimates that total emissions will peak at 193 million tonnes in 2020.<sup>26</sup> Another authoritative estimate puts the *worst case* scenario for 2030 (high growth and no strengthening of current policies) at 220 million tonnes, well below earlier BAU scenarios.<sup>27</sup>

There are three main uncertainties about the claim of Guangzhou as a success. First, data on greenhouse gas and other emissions remains highly variable in quality.<sup>28</sup> The problems of cadres falsifying reports (*xubao* 虚报) and playing with words (*wan wenzhi* 玩文字) are legend, although as Zhang shows in this special section these problems are declining.<sup>29</sup> These problems are probably less acute in Guangdong, which has gathered local data for longer than other provinces and which, along with Chengdu, is the only major Chinese city using a new international protocol for measuring city-level emissions (the Global Protocol for

23 Wang, Cheng and Zhao 2013; Zhao and Matsuoka 2013.

24 Du and Lu 2012; Yi et al. 2013.

25 Yu, Ge and Li 2014.

26 Xia and Luan 2014.

27 Sun, Yu and Liao 2016.

28 Fujikura et al. 2006.

29 Su et al. 2012; Zhang 2017.

Community-Scale Greenhouse Gas Emission Inventories). Guangzhou is also the only city outside of the provincial-level municipalities that publishes its own energy use data and energy balance table in its statistical yearbook.<sup>30</sup>

Another uncertainty is that emissions data in China (like India) does not include emissions related to goods and services imported from other regions in the country, so Guangzhou's efforts to reduce its coal and gas-fired electricity production, for instance, disappear from its emissions inventory even though the resulting imports transfer those emissions to other regions (mostly to other parts of Guangdong). One estimate of Delhi, for instance, showed that its total GHG rose by a third when such transboundary emissions were included.<sup>31</sup>

Finally, since Guangzhou is the only city where a detailed BAU scenario was calculated in the mid-2000s, it is not clear that it has been *relatively* more successful than other cities of similar size and economic structure. It is probably a success, but there may be others of greater interpretive value.

Emissions reductions can be disaggregated by sector and the factors at work, both policy induced and non-policy induced, identified. Four main sources of emissions – power generation, industrial use, buildings and transportation – have each contributed about a fifth of the reductions in Guangzhou's emissions. In power generation and industry, Guangzhou has enforced a series of overlapping policies to decrease emissions faster than BAU scenarios that already assumed some degree of deindustrialization. The city is, for instance, part of a provincial emissions trading scheme and emissions reductions plan for power generators and enterprises in iron and steel, petrochemicals and cement that, while suffering from heavy resistance from small- and medium-sized enterprises, cut emissions significantly from major state-owned enterprises.<sup>32</sup> Policies to reduce heavy industry led to a rapid rise of services, especially finance, transport, logistics, and creative, business and information services. Services accounted for 61 per cent of Guangzhou's GDP in 2010, and in 2012 GHG emissions from the services sector exceeded those from the industrial sector for the first time.<sup>33</sup>

On the consumer side, the city has piloted a national plan for three-tiered electricity pricing for consumers that significantly reduced electricity use through simple market incentives.<sup>34</sup> In buildings, Guangzhou has been able to mandate *and enforce* low-emission building codes just as its built infrastructure was being significantly expanded and upgraded. Finally, land use intensity has been significantly increased in urban areas, especially in the period since 2000, which preserves carbon sinks and reduces transportation and energy costs.<sup>35</sup> In public transportation, the Guangzhou bus rapid transit (BRT) corridor, opened in 2010, has the world's highest BRT bus flows, with one bus every ten seconds

30 Chen and Gong 2015.

31 Chavez et al. 2012.

32 Yi et al. 2011.

33 Zhang et al. 2015.

34 Wang 2015.

35 Gong et al. 2014.

into the city in the morning rush hour and 850,000 passenger-trips per day. The UN estimates that this project reduces Guangzhou's annual emissions by 86,000 million tonnes, which would be about a quarter of the city's annual emissions reduction in 2012.

If it is true that Guangzhou's emissions growth has been slowed significantly, and if it is also true that this is mainly due to policy interventions, then what political and administrative conditions made this possible?

One factor *not* at work is the "state signalling" of being one of China's eight nationally designated "low carbon cities" announced in 2010. Guangzhou is not on this list (although it was added to a much expanded list in 2012), and in any case this policy has had widely differing impacts across the country (and has not prevented another 150-odd cities declaring themselves to be low carbon cities as well). Instead, the state signalling that seems to matter more to Guangzhou is the central government's emphasis on environmentally sustainable urban development in general, which has been given a high priority in Guangzhou compared to other central government demands. In several studies of the city's urban development, scholars have found that the notion of "green branding" has been a key driver of policy decisions.

This is a meta-principle of urban policy that is intended to build a distinctive urban identity, bolster citizen support for government, and attract "clean" foreign investment.<sup>36</sup> Guangzhou's political leadership since the mid-2000s explicitly accepted the idea that the abatement cost curve for the city was significantly lower than for other cities because abatement would successfully drive economic transformation towards an innovation-based service economy.<sup>37</sup> Guangzhou's low carbon plans were embedded mainly in *other* forms of green branding, such as being a "national health model city."<sup>38</sup>

Several other cities like Dalian and Hangzhou share the green branding aim.<sup>39</sup> However in Guangzhou it is given political traction by a long indigenous tradition of setting priorities in ways that go beyond central mandates. In 2012, for instance, the city Party secretary, Wan Qingliang 万庆良, said that while it was important for city leaders to pay attention to central government demands on decarbonization, it was "even more important" to focus on the demands of being an advanced world city, especially on low carbon development. "City cadres should not act like frogs in a well" seeing only central mandates, he said.<sup>40</sup> While Wan was arrested in a national "anti-corruption" drive in 2015, large cities like Guangzhou tend to be less prone to sudden policy changes as a result of such exogenous shocks than smaller cities in China.<sup>41</sup>

36 Delman 2014; Ye and Zhang 2014.

37 Gao and Ye 2011.

38 Li et al. 2010, 360.

39 Hoffman 2011.

40 Li 2012.

41 Ishii and Muzones 2013.



Guangzhou is also subject to significant cosmopolitan influences. It hosted the United Cities and Local Governments (UCLG) World Council meeting in 2009 that created a Climate Negotiation Group on behalf of members. Preparations for the 2010 Asian Games were also a major driver of the political coalitions for green branding, while the BRT decision was made following a World Bank-funded study tour for Guangzhou officials of similar systems in Latin America.

This local political prioritization has meshed with Guangzhou's stronger-than-elsewhere social demands for environmental improvements, as seen in its urban forestry, industrial recycling and air-quality policies.<sup>42</sup> While this social pressure is not institutionalized, and thus cannot be considered a key linkage in the governance system, it nonetheless makes the "greening" strategy feasible for local elites. The mayor from 2003 to 2010 and Party secretary to 2012, for instance, was Zhang Guangning 张广宁, who had a background in the chemical industry yet became a vocal advocate of GHG mitigation. As mayor in 2010, Zhang responded positively to a group of student bike activists by putting them onto a newly constituted bicycle advisory commission.<sup>43</sup>

These findings so far mesh with those of Gong,<sup>44</sup> that local political leadership and coalitions explain why some cities in China are serious about decarbonization while others are not. But political will and feasible policy options are not enough without the *administrative* capacity needed to deliver outcomes. Guangzhou's high levels of economic development, as with the Shenzhen success story that Gong identifies, have considerably eased the fiscal and information constraints on administrative capacity. This finding, which echoes that on environmental enforcement of Van Rooij and colleagues in this special section,<sup>45</sup> is consistent with "ecological modernization theory." In particular, a high level of off-budget revenues is available to the city from land leasing that it can redirect to mitigation.<sup>46</sup> This has allowed Guangzhou, for instance, to offer the country's most generous "cash for clunkers" vehicle trade-in incentives. Guangzhou is also unusual, even among high-development areas of China, in its ability to mobilize resources effectively through organizational strategies that channel resources to the appropriate agencies. Effective capacity for mitigation requires multiple agencies that share not only resources but also priorities. GHG mitigation is in particular need of "joined-up government," which Ling defines as "based on the view that important goals of public policy cannot be delivered through the separate activities of existing organizations but neither could they be delivered by creating a new 'super agency'." Rather, joined-up government "aims to coordinate activities across organizational boundaries without removing the boundaries themselves."<sup>47</sup>

42 Van Rooij et al. 2013.

43 Hu 2011.

44 Gong 2015.

45 Van Rooij et al. 2017.

46 Wang, Potter and Li 2014.

47 Ling 2002, 616.

The importance of joined-up government at the administrative level is highlighted by the failure of Baoding, which Kostka attributes in part to an overcentralization of administrative responsibility in a single agency (which lacked fiscal and informational resources) followed by an overdevolution to multiple agencies (which did not all put a high priority on mitigation).<sup>48</sup> In Guangzhou, Mai and Francesch-Huidobro found that joined-up government is unusually strong through what they call a “climate municipal network.”<sup>49</sup> This network includes agencies like the Development and Reform Commission, the Chinese Academy of Sciences’ Guangzhou Institute of Energy Conversion, the Urban-Rural Construction Commission and district governments. Subjectively, the street-level environmental bureaucrats in Guangzhou point to these horizontal linkages and collaboration as playing the key role in their administrative success.<sup>50</sup> This “administrative network” explanation jibes with the “governance community” idea that Shin describes elsewhere in this special issue.<sup>51</sup>

Two leading groups, a 30-agency group on low carbon development and a 31-agency group on energy efficiency, provide a platform where collaborative governance within the public sector can be achieved, in contrast to the coercive/regulative approach that existed before they were created in 2010 and 2011 respectively. That has made Guangzhou an easy site, for instance, in which to implement a World Bank-sponsored “green freight” programme that improves truck efficiency through multi-agency efforts or for the national government’s selection in 2016 of the Guangzhou Carbon Emissions Exchange as the national training site for carbon exchange managers. It also allows multi-agency coordination to ensure compliance. For instance, rather than relying on fines for excess emissions from the Guangzhou Auto Group’s Honda affiliate, the city EPA was able to incentivize action through afforestation offset projects coordinated with the city’s forestry bureau and its network across the country.<sup>52</sup> The Guangzhou EPA also partners with the city’s Finance Office and Development and Reform Commission to restrict credit access to enterprises exceeding environmental targets, as well as with its power supply bureau and district and county governments to raise power prices for high-emission enterprises that cannot easily be shut down.<sup>53</sup>

These networks also include large state and private corporations that are deeply enmeshed in GHG emissions questions, both because of the bottom-line impact and also because many of them are part of global supply chains that require them to meet higher mitigation goals than the city requires.<sup>54</sup> In a globalized and high-development city, corporations are often front-running urban policy. At the public meetings where this “climate municipal network” can be seen in

48 Kostka 2014, 22.

49 Mai and Francesch-Huidobro 2015, 265.

50 Zhan, Lo and Tang 2014.

51 Shin 2017.

52 Guangzhou Environmental Protection Bureau 2012.

53 Guangzhou Municipal People’s Government 2015.

54 Yee, Lo and Tang 2013.

action – such as the preparatory meetings among large enterprises and municipal officials prior to the operational launch of the Guangzhou Carbon Emissions Exchange in 2014 or the public hearings on three-tiered electricity pricing held in 2012 – the documentary evidence points to actual deliberation and problem-solving, in contrast to the stilted atmosphere of most such meetings in China.

To summarize, the Guangzhou case shows that mitigation success arises when local political priorities are tied to a collaborative climate network within administrative agencies. Mitigation at the sub-national level in China works through “joined-up government” that arises when these political and administrative conditions are met. Beijing’s “state signalling” appears in this framework to operate mainly as a legitimating device for actions driven by local conditions, interests and demands.

### The Case of Gujarat

Gujarat is an industrial state with a population of 60 million, or 5 per cent of India’s total, and a GDP worth 8 per cent of India’s total in 2012. It is a relatively wealthy state but, like Guangzhou, it is vulnerable to climate change in the form of rising sea levels and extreme weather. Its emissions were virtually the same as those of Guangzhou in 2012 at about 150 million tonnes of CO<sub>2</sub>-equivalent, including 130 million tonnes of actual CO<sub>2</sub>. So, like Guangzhou, it emits roughly as much as a medium-sized European state or developing nation.

Gujarat can be called a success because it has reduced its emissions growth not only faster than other states in India but also faster than business-as-usual scenarios that were done for the state in the mid-2000s. Historically, Gujarat accounted for a larger share of India’s GHG emissions than its share of the population.<sup>55</sup> But after peaking in 1984, its share has fallen steadily even as its economy has grown faster than elsewhere (see [Figure 2](#)).<sup>56</sup> Its contribution to India’s emissions is now less than its contribution to GDP and less than its share of the population. At the city level, Gujarat’s major industrial city of Ahmedabad (accounting for 6 per cent of the state’s emissions) had the lowest CO<sub>2</sub> equivalent emissions per capita and the third lowest CO<sub>2</sub> equivalent emissions per unit of economic output of the seven major urban centres studied by Ramachandra and colleagues based on 2009–2010 data.<sup>57</sup> Moreover, there is less concern about displaced emissions to other places because most of Gujarat’s cement, food processing, power and transportation infrastructure is within the state itself. So Gujarat has been greening faster than the rest of India.

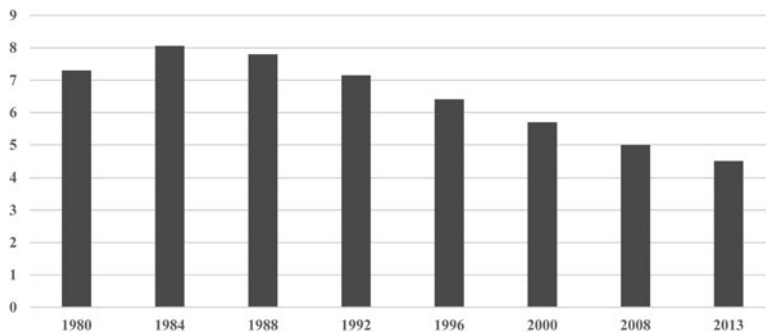
As with Guangzhou, it is relatively easy to identify the mitigation policies that have directly contributed to this success. First and foremost is a large increase in solar power generation capacity. Gujarat accounts for 20 per cent of India’s total

55 Ghoshal and Bhattacharyya 2008.

56 Ghoshal and Bhattacharyya 2012; Ramachandra and Shwetmala 2012.

57 Ramachandra, Aithal and Sreejith 2015.

Figure 2: Gujarat's GHG Emissions as a % of India's GHG Emissions



Source:

Gujarat Energy Development Agency.

solar power capacity (and 17 per cent of its installed wind capacity).<sup>58</sup> The state's policy to boost solar power was announced in 2009, a year before the central government announced a national policy. The Gujarat Solar Park has 700 megawatts of installed capacity which will rise to 1,000 megawatts, making it the biggest solar installation in the world, while the Charanka Solar Park has a further 590 megawatts of capacity. These investments, as well as others such as the "rent a roof" policy that allows private companies to rent rooftops of public and private buildings, and policies to support canal-top mounted solar structures, have been emulated elsewhere in India. They were brought about by effective government policy incentives relating to connectivity and feed-in tariffs. For instance, while tariffs for National Solar Mission projects were driven down by competitive bidding, Gujarat offered fixed tariffs that attracted more investment.<sup>59</sup> The government was also more aggressive in attracting foreign investment for clean-development mechanism projects. At the end of 2012, Gujarat accounted for 18 per cent of the value of India's Clean Development Mechanism (CDM) projects.<sup>60</sup>

Beyond this "market plus" approach have been significant regulative policies. New manufacturing plants in the state need to buy "green credits" by purchasing land for set-aside purposes, a sort of domestic CDM mechanism. In addition, even non-polluting enterprises can purchase green credits in this way that they can later exchange for tax breaks. Meanwhile, compressed natural gas conversion in vehicles was mandated in Ahmedabad and was part of a broader switch to gas that was supported by the state-led investment in gas pipelines and supply infrastructure. Like Guangzhou, Ahmedabad also created its country's largest BRT

58 Government of India 2015.

59 Yenneti 2014; Pathak and Muller 2016.

60 National CDM Authority 2015.

mass transit system, which opened at 45 km in 2009 and will nearly double in size to 85 km by 2025.

Again, if these and other policy interventions have contributed significantly to Gujarat's success, then what political and administrative conditions made this possible? How did good policy ideas become good policy outcomes?

The political conditions in Gujarat are critical because, unlike China, the national government of India did not commit to emissions reductions until 2015 and has made adaptation not mitigation the focus of its climate change policy. If there is "state signalling" in India, its use is to downplay mitigation altogether. While in China, central signals legitimate local climate action, in India *local* political demands legitimate local climate action. Indeed, Gujarat has always been slow to respond to central mandates on climate change, never having submitted a state climate action plan as requested by the central government for example.

Gujarat's political context, like Guangzhou's, has some unusual features that make it conducive to such locally driven action. Its labour unions and "anti-poverty" activists are weak compared to the rest of India, which means that mitigation measures that affect cheap coal or dirty state-owned industries face less opposition. The political culture is generally pro-business, as evidenced by its annual Vibrant Gujarat global business conference and by the critiques of the state's market-driven growth model from socialist scholars like Anita Dixit.<sup>61</sup>

The close working relationship between the state and private sector vastly reduces the risks associated with the uncertainty of solar policy in particular, stimulating investment.<sup>62</sup> Like Guangzhou, it is also an especially cosmopolitan part of India, in the sense of being open to international policy diffusion instead of homespun solutions. The Gujarat Solar Park, for instance, was initiated based on the findings of a study conducted by the Clinton Foundation and the University of Delaware's Center for Energy and Environmental Policy in 2008.

An additional political factor was the role of Narendra Modi as chief minister of Gujarat from 2001 to 2014 before becoming India's prime minister. Modi made himself into a sort of Al Gore figure for India in the sense that climate change mitigation was a key aspect of his political profile. Modi's climate change push began when his Party, the BJP (Bharatiya Janata Party) was in power nationally (from 1998 to 2004), which meant that the federal government did not block the many "strong state" initiatives he launched in Gujarat. As such, Modi was able to operate somewhat like a developmental dictator, at least in the Indian context. As he writes in a book on the state's policies: "Within a democratic framework, and despite electoral constraints, things can happen and will happen if they are planned and executed with single-minded devotion to a larger cause and with a firm determination to fight climate change."<sup>63</sup> The Charanka Solar Park, for instance, was built on a 2,000 hectare site in Patan in just 16

61 Dixit 2013; Dixit 2010.

62 Pathak and Muller 2016.

63 Modi 2011, 14.

months (opening in 2012), after the state purchased 918 hectares of private land for a comparatively generous outlay of \$280 million (a legal challenge to the high prices was finally rejected in 2015). Extensive social consultation, which in India has often led to rent-seeking and developmental failures, was minimal. Social resistance was mounted only by the largest landowners.<sup>64</sup> As Modi wrote in his book: “The divide between political cycle and carbon cycle can be filled by firm determination and resolute will ... No electoral constraints or other factors could inhibit our firm devotion to this cause.”<sup>65</sup>

Modi’s leadership was carried out through strong state–society coalitions that emphasized co-benefit approaches that often made it indistinguishable from modernization. Unlike Guangzhou residents, Gujaratis are not notably “green” in their policy preferences compared to the national population.<sup>66</sup> Instead, initiatives such as solar power were justified as a solution to energy poverty (just as an earlier solar cooker invented and marketed by the Gujarat Energy Development Agency (GEDA) in 1979 was justified as an anti-poverty technology). Restoring forests and air quality was justified as consistent with modern Hindu back-to-nature narratives. Simple energy savings would boost economic growth, technological innovation and CDM revenues. The title of Modi’s book *Convenient Action* was an intentional play on Gore’s *Inconvenient Truth*, articulating mitigation policy as a positive economic opportunity rather than a negative environmental imperative. Modi issued a nationally oriented book under the same title at the Paris climate talks in 2015.<sup>67</sup>

The administrative piece of the Gujarat puzzle follows closely from the markets-plus-regulation policies and the co-benefits-based state-society politics. Whereas Guangzhou’s administrative success comes from a governance network that operates primarily *within* the state, Gujarat’s success comes from a governance network that operates primarily between state and business actors within each mitigation policy area. Guangzhou has joined-up *government* while Gujarat has joined-up *governance*. Modi described this as a “queer admixture of two development strategies” of direct top-down government intervention and bottom-up private sector participation.<sup>68</sup> In general terms, those parts of India with stronger private sector economies have been the most successful in emissions mitigation because, as Never shows, private business in India is less beholden to patron–client relationships than citizens or bureaucrats and is more able to articulate a growth-based mitigation agenda (“green growth”).<sup>69</sup> Since mitigation is not a neo-patrimonial good, the mechanisms of “political mediation”<sup>70</sup> through which political actors usually force bureaucratic action

64 Yenneti and Day 2015.

65 Modi 2011, 228.

66 Sainath and Rajan 2015.

67 Modi 2015.

68 Modi 2011, 14.

69 Never 2012.

70 Berenschot 2010.

in India do not work in this case. Instead, bureaucratic action is spurred by “private mediation” from local businesses.

Like Guangzhou, Gujarat’s significant number of foreign-invested (or foreign supply chain) firms also significantly enhances incentives for mitigation because green measures from advanced economies are diffused through the supply chain. Rola and colleagues found that vertical supply chain pressures were the most important driver of green practices in Gujarat’s chemical industry, ahead of both environmental regulations and social pressures.<sup>71</sup>

Gujarat is also unusual in India in taking seriously the need for administrative capacity-building for mitigation measures. In 2008, it signed an agreement with New Delhi’s Energy and Resources Institute (TERI) to build administrative capacity for climate change policy in the state.<sup>72</sup> Since then, it has created a Management Education Center for Climate Change at Gujarat University that sends staff directly into key agencies such as GEDA. The bureaucracy thus has an adaptive capacity that is often missing in India. For instance, the state’s Pollution Control Board accepted the recommendations of an MIT-led study<sup>73</sup> of industrial emission auditors that auditors not be paid by the plants they are auditing and that their pay rates be tied to accuracy as determined by a “back checker” system of random double-checking of their audit findings.

The administrative momentum in Gujarat also explains why Modi’s departure to national office did not slow the state’s decarbonization. GEDA continues to plan and execute major renewables projects, including a 1.2-megawatt, 4,096-panel solar array on the semi-private Ahmedabad city hospital that began operation in 2016.<sup>74</sup> GEDA’s 2015 to 2020 solar power policy renews and expands the commitment to solar power in the state.

To summarize, the Gujarat case reinforces the findings from Guangzhou, namely that mitigation success in China and India arises when *local* political priorities are tied to collaborative climate networks. These operate mainly within administrative agencies in China but through public–private relationships in India. New Delhi’s “market plus” approach appears in this framework to be largely irrelevant to outcomes. Again, local interests and demands dominate.

## Conclusion

International climate talks have very little to do with climate mitigation outcomes in either China or India. National government planning, meanwhile, provides at best a framework for action. Instead, it is local governments that are more likely to provide effective governance solutions to greenhouse gas mitigation.

71 Rola, Junare and Dave 2013.

72 The Energy and Resources Institute 2008.

73 Dufflo et al. 2013.

74 *Ahmedabad Mirror*, 6 January 2016. “Civil hospital to be powered by solar panels” 2016.

China and India's decarbonization policies share one essential feature that has long been associated with public policy in developing countries, namely the close interdependence of politics, policy and administration. As Grindle and Thomas found, this means that elite ideas are one of the few truly independent factors (alongside international policy diffusion effects) in such contexts since they alone can break governance deadlocks.<sup>75</sup> As we have seen, elite political ideas in Guangzhou legitimated by central signals and facilitated by local citizen pressures created a "green branding" approach that made mitigation possible. In India, elite political ideas in Gujarat facilitated by local business pressures led to a similar green branding and resultant mitigation. Policy images that took shape locally are what mattered. In both cases, it is the *insignificance* of central–local relations (as well as international climate negotiations) that is surprising. What makes governance effective has more to do with local political economy and culture, cosmopolitan influences and administrative networks.

These findings have both conceptual and policy implications. Conceptually, the two cases remind us of the importance of theorizing integrated governance solutions that take seriously both the upstream political issues as well as the downstream administrative ones. China's pathway, as illustrated by Guangzhou, involves a form of intra-state joined-up government, while India's pathway, as illustrated by Gujarat, involves a form of state-society joined-up governance. These approaches deepen our understanding of China's "state signalling" and India's "market plus" approaches by showing how political incentives and administrative capacities arise for successful outcomes. In terms of research, they highlight the need for more research on the comparative public administration of emissions reductions in the two countries.

For international policy, the results show that diplomatic negotiations should not be the focus of attention. Instead, international partners should pay more attention to policy diffusion and learning opportunities for local leaders in China and India to identify low carbon policy ideas and images from abroad. The results also affirm the importance of international trade and investment in reducing emissions through global green supply chain effects. Proponents of trade agreements should highlight these benefits. Also, if it is true that the key to decarbonization in China and India is local climate governance networks, then direct international support for such networks in the form of training and knowledge-sharing through organizations such as the United Nations Public Administration Network makes sense. Finally, green local political leadership should be rewarded by encouraging green local leaders in China and India to share their experiences abroad. In an era of emerging climate crisis, local leaders may find that their careers benefit significantly from such recognition.

75 Grindle and Thomas 1991.



## Biographical note

Bruce Gilley is an associate professor of political science at Portland State University, Oregon. His research centres on democracy, legitimacy, climate change and global politics, and he is a specialist on the comparative politics of China and Asia. He is the author of four university-press books, including *The Right to Rule: How States Win and Lose Legitimacy* (2009) and *China's Democratic Future* (2004) in addition to several co-edited volumes and journal articles.

**摘要:** 在世界上最大的两个国家减少温室气体排放, 需要集成政治, 政策和治理可行的治理途径。使用成功缓解的例子在中国 (广州) 和印度 (古吉拉特) 地方层面, 本文综合确定治理解决方案, 在这两种情况下, 通过不同类型的联系工作。在中国, 它主要是政府内部的联系, 而在印度, 它主要是国家与社会的联系。在两种情况下做的关于减排目标的国际谈判有显著的影响, 而国家框架只有边际效应。这种方式比较接近问题有助于澄清温室气体治理在各个国家是如何运作的教训, 为中央与地方环境的关系, 以及对国际援助的影响。

**关键词:** 温室气体排放; 碳排放; 减缓气候变化; 治理; 政策; 地方政府; 公共管理

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