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Experts and the science-policy interface in China's climate policy

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Chapter 7: Experts and China's Provincial Climate Policy⁵²

7.1 Introduction

Following the discussion on SPI and China's foreign and national climate policy, this chapter examines SPI in China's provincial climate governance. I seek to answer the question: *How do experts engage in China's provincial climate policy, and how do policymakers demand and accept the experts' input?* Taking the low-carbon province pilot programme (LCPPP), GHG emissions inventory (EI), and the pilot emissions trading scheme (ETS) in Guangdong Province as examples, Chapter 7 illuminates the role of experts in Guangdong's climate policy dynamics. Section 7.2 introduces the evolution of China's provincial climate policy and the primary source of scientific input behind policymaking. With the focus on experts' engagement with Guangdong's LCPPP, EI, and ETS, Sections 7.3, 7.4, and 7.5 examine the input, process, and output of the SPI. Section 7.6 explains how policymakers' demand and political considerations influence the intersection of science and policy.

7.2 China's provincial climate policy and the primary source of scientific input

This section briefly introduces the development of China's provincial climate policy and its primary scientific input. In China's centralised political system, provincial governments have to follow central policy directives and meet the targets allocated by the central government (e.g., the target for energy consumption and emissions reduction set in the Five-Year Plans [FYPs]). Meanwhile, provincial officials have autonomy and are encouraged to experiment with innovative measures and models for achieving the policy goals through pilot programmes (Ding and Yang, 2015). Hence, experts have a lot of space to drive provincial climate policies in China (Mai and Francesch-Huidobro, 2015; Chen, 2017).

7.2.1 Evolution of China's provincial climate policy

In terms of the evolution of China's provincial climate policy, there are two waves of development since the 2000s. The first wave is the institutional establishment for addressing climate change and energy-conservation and emissions-reduction from mid-2007 onwards. The second wave is the rapid onset of climate-related policy programmes after the 2009 Copenhagen COP.

From mid-2007 onwards, Chinese provincial and municipal governments established

⁵² This chapter has been mostly extracted from the author's published peer-reviewed article: Chen, Liang-Yu. 2017. "How do Experts Engage in China's Local Climate Governance? A Case Study of Guangdong Province." *Journal of Chinese Governance*, Vol. 2, No. 4, pp. 360-384.

special task forces or specialised offices to coordinate climate policies following the central government's command (Qi, et al., 2008; Tsang and Kolk, 2010; Li, 2013). Regarding the task forces, the leading group or the joint meeting for addressing climate change is set by local governments to enhance the horizontal coordination among departments. Regarding the specialised offices, local governments turned to restructure the present Division of Resource Conservation and Environmental Protection into the Division of Resource Conservation, Environmental Protection, and Climate Change, or even establish the Division of Climate Change as a new division under the provincial or city Development and Reform Commission (DRC). Meanwhile, the central government set the target for energy intensity reduction as an important indicator to assess local cadres beginning with the 11th Five-Year Plan period (2006-2010). Hence, provincial officials are more motivated to implement energy-related policies and, therefore, contribute to GHG mitigation (Teng and Gu, 2007; Chen, 2017: 374).

The second wave was the rapid onset of climate-related policy programmes since 2010. After the 2009 Copenhagen Conference, the Chinese central government enhanced its climate policy and launched a series of national pilot programmes mandating local governments to experiment with 'low-carbon development' (LCD) (Chen, 2017: 361). With this, LCD suddenly became a high priority of provincial and lower governments (Interviews 12, 14, and 20).

7.2.2 Provincial research centres and expert committees as primary source of scientific input

The first main source of scientific input for China's provincial climate policy is the Provincial Research Centre for Addressing Climate Change/Low-carbon Development (hereafter Research Centre) in each province. Provincial officials set up such a research centre to mirror the institutional establishment at the national level. In most cases, provincial governments were inclined to co-build the Research Centre with existing research institutes subordinated to the provincial government departments or with local universities. With higher research capacity and expertise, the experts employed at the Research Centre could then undertake substantial policy work for the officials, such as making an emissions inventory and low-carbon planning (Interviews 26 and 29). In the least developed regions, e.g., Southwest and Northwest China, the established Research Centre is almost the only scientific resource that assists provincial officials with planning and implementing climate-related policies (Interviews 29, 39, and 63).

Another key expert institution in China's provincial climate governance is the Expert Committee on Climate Change/Low-carbon Development. Since the capacity for addressing climate change remained weak at the provincial level compared with that in

Beijing, the Expert Committee as a knowledge platform has strengthened the capability of provincial governments to deploy climate-related policies (Chen, 2017; Lo and Chen, 2019; Interviews 51, 53, and 54).

Since provincial officials lack the capacity to develop climate-related policies in general, there is sufficient space for experts to participate. Acting as a bridge between governmental, business, and societal organisations, experts consequently play the role of ‘policy middlemen’ and are, therefore, influential in China’s provincial climate governance (Mai and Francesch-Huidobro, 2015; Chen, 2017: 367; Lo and Chen, 2019).

In terms of the scientific input for Guangdong’s climate policy, there are multiple sources that form a knowledge network (Interview 58). Apart from the Provincial Research Centre and the Expert Committee, several research institutes are also involved in the policy dynamics. The boundary and structure of such a knowledge network is not static. Research institutes with varied expertise contribute to dealing with different policy issues and play an essential role in different policy stages (Chen, 2017; Lo and Chen, 2019) (see below for details). In this regard, my research finding echoes some previous research. First, local experts’ involvement is “a continuous, dynamic, and adaptive process that is amenable to the developmental needs of policy” (Lo and Chen, 2019: 10). Second, “expert organisations whose capabilities with current policy priorities are more likely to be brought into the development process” (Lo and Chen, 2019: 9).

7.3 Case I: Guangdong Province’s low-carbon province pilot programme

This section examines SPI in Guangdong Province’s participation in the low-carbon province pilot programme (LCPPP) launched by the central government in 2010. All three SPI models (i.e., the science-push, policy-pull, and co-production) can be observed. Since the Guangdong officials lack the capacity for deploying climate-related policies, experts play a substantial role in preparing and carrying out the LCPPP. Their impact on the policy process can be rated as between levels 4 and 5 (high/very high).

7.3.1 Low-carbon province pilot programmes as a gripper

While the central Chinese policymakers began to deploy subnational climate policies in the late 2000s, they have not yet developed a policy model or framework for all provinces and cities due to the vast socio-economic differences between regions. Hence, rather than designing traditional sector-based policies, they saw the low-carbon province (and city) pilot programme as a ‘gripper’ (抓手 *zhua shou*) to explore their customised policy instruments to reduce GHG emissions (Ding and Yang, 2015).

One can see the LCPPP as a moderately structured problem (means). There are no

explicit contestations regarding policy-relevant knowledge among the experts. Yet, regarding the policy goals put into the LCPPP, there are various considerations among department officials. According to the NDRC's mandate, the pilot regions must fulfil five missions: To (1) propose a low-carbon development plan, (2) formulate supporting policies for low-carbon and green development, (3) build up a low-carbon industry system, (4) establish a GHG emissions statistics and data management system, and (5) encourage low-carbon and green lifestyles and consumption patterns (NDRC, 2010). Since the central government only gives guidelines, provincial policymakers have room to set their goals and measures (Interviews 50 and 55).

7.3.2 Science-push: experts lobby both provincial and central officials to launch the LCPPP

From the perspective of 'science-push,' experts have made three main contributions to Guangdong's LCPPP. The first is stimulating the idea of transformation of Guangdong officials towards low-carbon development and preparing the application materials of the LCPPP. The second is assisting the Guangdong officials with lobbying the central government to select Guangdong Province as a pilot region. The third is that after the NDRC chose Guangdong as a pilot province of LCPPP, experts assisted the Guangdong officials with developing innovative measures and compiling policy documents for implementing the policy project (Chen, 2017).

In terms of the scientific input for Guangdong's LCPPP, the Guangzhou Institute of Energy Conversion (GIEC) under the Chinese Academy of Science played the most critical role in lobbying the officials and preparing the proposals for applying for the pilot programme to the central government (Han et al., 2012; Chen, 2017; Interviews 50 and 53). With the assistance of the GIEC, the Guangdong government actively demonstrated its willingness, capacity, and preparatory work for carrying out the pilot project. When the NDRC launched the low-carbon province/city pilot programme in five provinces and eight cities in August 2010, Guangdong was one of the five pilot provinces. Although one cannot simply conclude that it was the experts that pushed the NDRC to list Guangdong as a pilot province, it is not easy for Guangdong officials to lobby and convince the central government without the experts' assistance (Interviews 46, 47, 49, 53, 57, and 58).⁵³

⁵³ Another evidence explains the significant stance of Guangdong Province among the first batch of pilot provinces. During 2005 and 2007, the NDRC has undertaken a research project with the World Bank titled 'Development of China's National Climate Change Programme and the Outreach to the Local Provinces' (NDRC, 2007 (b)). The NDRC selected four provinces as case studies — Jilin, Yunnan, Shangxi, and Hubei. Not surprisingly, when the NDRC promulgated the first batch of low-carbon province/city

7.3.3 Policy-pull: experts assist provincial officials with compiling policy documents

Once the Guangdong officials decided to experiment with the LCPPP, the foremost task was to draft a plan detailing policy objectives and the deployment of low-carbon policies. After that, related departments could implement the measures to reach the proposed policy objectives. Since the Guangdong officials were not familiar with setting climate-related policy goals and developing measures, the policy-pull model presents how policymakers demand experts to provide administrative knowledge in carrying out Guangdong's LCPPP.

The Guangdong Provincial Development and Reform Commission (GD-DRC)⁵⁴ is in charge of Guangdong's LCPPP. In general, the most relevant work of the officials is to distribute and coordinate projects, including research projects undertaken by research institutes. When officials commission a project to a research institute, they often request two versions of the project report—a full report showing all research results, and an initial draft of policy plans or related administrative measures called the 'recommended programme' (建議方案 *jianyi fangan*) (Chen, 2017: 367; Interviews 50, 53, 54, and 60). In practice, the officials read the latter more often (Interviews 50, 53, 56, and 60), indicating their demand and acceptance of administrative knowledge. Collecting the initial drafts of policy documents, the GD-DRC officials then further integrate the components, assign the responsibilities to each department, and decide whether to release the policy document or not, and in which format (Chen, 2017: 367-368; Interview 56).

Regarding who the experts are in Guangdong's LCPPP, before 2010, the GIEC and the Guangdong Climate Centre (GDCC) were the first two research institutes to coordinate the research and preparation for policy documents such as the *Guangdong Climate Change Programme*, the *Guangdong Provincial Climate Change Action Plan*, and the *Guideline for Guangdong's Low-carbon Economic Development*. Later, two institutes joined as additional key players: the Guangdong Techno-economy Research and Development Centre (GDTE), a semi-official research institute that falls under the Guangdong Provincial Department of Science and Technology (GD-DST), and the Research Centre of Low-Carbon Technology and Economy at the SYSU (Chen, 2017: 368; Interviews 56, 59, 60, and 62).

A concern when drafting Guangdong's low-carbon plan is that the function of a plan

pilot programme in 2010, the four provinces mentioned above were all assigned as pilot provinces due to their accumulation of interacting with Beijing and innovation of policy measures. At the same time, Guangdong Province is the only province that has not been chosen in the research project but later selected by the NDRC as the additional pilot province. Some believe that it can refer to the Guangdong officials' political will and Guangdong experts' scientific support.

⁵⁴ After China's government restructuring in 2018, the Department of Ecology and Environment (DEE) took over the authority of climate change relate policies.

in the Chinese political system and the nature of the climate change issue increases the difficulties of the experts to complete their work. As a function of the Chinese governing system, a ‘plan’ (規劃 *gui hua*) can be viewed as a bargaining process comprised of ongoing negotiations among different government departments (Guttman and Song, 2007: 423). Meanwhile, the cross-sectoral nature of climate-related issues has posed new challenges to compile a low-carbon plan (Chen, 2017: 368). While sorting the policy measures and targets, experts have to accumulate data regarding all existing ‘special plans’ (專項規劃 *zhuan xiang gui hua*)⁵⁵ promulgated by different departments and to synthesise a plan that covers each department’s jurisdiction (Chen, 2017: 368; Interviews 53, 56, and 61).⁵⁶

Additionally, Guangdong officials also mandate experts to solicit opinions from related industries and enterprises. Once experts have generated the draft low-carbon plan, the GD-DRC officials issue the draft to all concerned government departments, enterprises, and academic institutes for commentary (Chen, 2017: 368). Regarding the horizontal coordination within the Guangdong government, the GD-DRC officials request comments through meetings of the Guangdong Provincial Leading Group on Climate Change and through joint sessions of the concerned departments (Chen, 2017: 368). This can be viewed as a process of intra-governmental communication, conflict mediation, and resource distribution (Mai and Francesch-Huidobro, 2015: 108). Before the final version of the policy document is generated, experts process all the comments and proposed solutions (Chen, 2017: 368; Interviews 50, 53, and 56).

While the mission of experts is to detail policy targets and measures within the low-carbon plan, government officials are authorised to assign the responsibilities to relevant actors and to distribute these amongst the related departments (Chen, 2017: 369; Interviews 50, 53, and 60). In accordance with the particulars in the respective policy papers, each department assumes responsibility for its own jurisdiction. Since experts do not have the authority or power to coordinate the related governmental bodies, joint sessions with officials from different departments and discussions within the leading group are vital to reaching consensus on the final plan (Chen, 2017: 369; Interviews 51, 53, 54,

⁵⁵ For instance, the *Guangdong 12th Five-Year Plan for Transportation*.

⁵⁶ The GIEC informant gave an example of how experts absorb different sectors’ policy goals and measures to compile the low-carbon plan. In the initial draft of the *Guangdong 12th Five-Year Plan for Climate Change*, experts proposed to replace the aging buses in Guangdong. During the joint sessions and the process of soliciting comments from the related departments, the Guangdong Provincial Department of Transportation pointed out that the Department had already implemented a program to replace the ageing bus fleet currently using liquid petroleum (LPG) to liquefied natural gas (LNG). Hence, the GIEC experts modified the section of transportation in the low-carbon plan with the updated data (Interview 53).

and 55).

7.3.4 Co-production: experts play a mixed role of both experts and agents of the officials

After the Guangdong officials submit the *Guangdong Provincial Climate Change Action Plan* to Beijing and the NDRC approve the *Action Plan*, the next step for Guangdong is to deploy measures to achieve the proposed policy goals. At this stage, experts play a mixed role, not only as experts that provide expertise but also as agents of the officials and sometimes even government administrators (Interviews 56 and 60). Hence, one can also apply the co-production model to describe the experts' involvement in Guangdong's LCPPP.

Given insufficient staff and limited expertise in the Division of Resource Conservation, Environmental Protection, and Climate Change under the GD-DRC, officials tend to seek external organisations that could further support their work on climate policies (Interview 56). Hence, apart from the GIEC that contributed to capacity building, the GD-DRC officials further built the Research Centre of Low Carbon Technology and Economy at the SYSU in 2011. At the initial stage, the Research Centre hired around twenty to thirty employees, mostly under forty and with at least a Master's or even PhD degree (Interview 56). These young but energetic experts not only contributed to researching low-carbon policies but also undertook some administrative work of the GD-DRC (Interview 56). By organising training sessions for local industries and stakeholders, the SYSU experts, alongside the GIEC and other expert institutes, assisted the Guangdong provincial government with promoting the ideas of low-carbon development and emissions trading to enterprises and the public (Interviews 50, 53, and 56). Experts helped the provincial officials to transmit climate-related policy documents to both officials and stakeholders in prefectural cities, townships, and communities (Interviews 50, 53, and 56). In this regard, rather than just providing scientific advice, experts are agents of the officials and are sometimes government administrators that undertake the administrative work.

7.3.5 A higher degree of policymaker's demand and experts' impact on Guangdong's LCPPP

Concerning the experts' policy impact on Guangdong's LCPPP, my field research reveals that experts influence policymaking and implementation. There are two main reasons: the centre's demand for urgent local action and the local lack of capacity. Compared with the national level, climate change and low-carbon development are novel concepts for provincial and local officials since they used to treat such issues as a foreign matter restricted to international negotiations (Chen, 2017: 363-364; Interviews 10 and 63). Hence, once the central government asked provincial governments to accelerate the

deployment of climate-related policies, provincial officials' demand for external inputs from experts is more than the central officials have. In this context, my empirical study echoes Lo and Chen's (2019: 9) assertion that more than playing an advisory role, experts are even playing a substantive role in China's provincial and local climate governance due to the local officials' mandate.

In Guangdong's climate governance, most interviewees confirm that the provincial officials are open-minded and willing to listen and accept experts' advice before making a decision and are very likely to adopt experts' suggestions (Interviews 50, 51, 52, 53, 54, 55, 56, and 57). One interviewee employed at the Guangdong Academy of Social Sciences (GDASS) gave an example to show officials' attitudes towards experts' expertise. As a junior who participated in an expert meeting of the GD-DRC to discuss the pilot of 'Near-zero Carbon Emission Zones,' one of the key projects under the framework of the *Guangdong 13th Five-Year Plan*, he was impressed that the officials listened to the experts' advice carefully:

W, Vice-Director of the GD-DRC, walked into the conference room and said, 'First, we (the officials) have not yet decided how to implement the pilot project. Second, since the policy text does not speak, we want to collect your [the experts] thoughts regarding how to carry out the project.' Then, many experts expressed their opinion; even young scholars joined the discussion and gave their advice. The chairperson, H, Head of the Division of Climate Change, took note of each comment seriously, and said the officials will further work on the draft of administrative measures of the pilot project, and to call for experts' comments later.

(Interview 54)

Eventually, the GD-DRC adopted the experts' recommendations, including the definition and scope of the near-zero carbon emission zones, the areas to undertake the pilot project, and the policy measures for experimenting in such pilot areas (Guangdong Solar Energy Association, 2017).

7.4 Case II: Guangdong Province's GHG emissions inventory

The second case study of expert involvement in Guangdong's climate policy is their contribution to inventorying Guangdong's GHG emissions. The policy-pull model can best describe SPI in Guangdong's GHG emissions inventory. And, I consider experts' impact on the policy process as level 5 (very high).

7.4.1 Emissions inventory as a cornerstone of local climate governance

The work of emissions inventory (EI) is the cornerstone of climate governance because it shows who is emitting GHGs (D'Avignon et al., 2010: 4838). It allows the identification of the most effective areas of action and the preparation of feasible policies, leading to the development of effective and efficient plans including identifying essential key players and stakeholders (D'Avignon et al., 2010: 4838-4839).

One can see EI as a moderately structured problem (ends). While the Guangdong experts started working on the EI, some considered the *Guideline for Provincial GHG Emissions Inventory* compiled by a groups of Beijing experts to be “overtly theoretical and somewhat problematic to engage with” (Chen, 2017: 369-370; Interviews 47, 56, and 60). Hence, they had to use ‘local knowledge’ to explore the feasible ways to complete the data collection process (Chen, 2017: 370; Interview 60).

7.4.2 Policy-pull: expert institutes as appropriate entities to fulfil the work

Given the vast political, economic, and social differences between regions, the central government deploys a procedure of bottom-up reporting of emissions data and top-down supervision to complete the EI. Considering that the EI includes data revealing not only the development status of local industries, but also provides a broad outline of the performance of local governments, it is deemed too politically sensitive to commission such work to private enterprises, such as environmental consultancy firms (China Climate Change Info-Net, 2010; Chen, 2017: 369). Hence, local research institutes or universities are considered to be the more appropriate entities for undertaking such work (China Climate Change Info-Net, 2010; Chen, 2017: 369; Interviews 50, 61, and 62).

In terms of the research institutes that engage with Guangdong’s GHG EI, the GDTE plays the role as coordinator (牽頭方 *qian tou fang*) of the task force, and several institutes joined the task force to aid the investigation and data collection process for specified emissions sources (Chen, 2017: 365; Interviews 50, 53, and 60) (see *Table 7.1*).

Table 7.1 Contribution of research institutes to Guangdong's GHG emissions inventory

Source categories of the GHG emissions inventory	Main responsible research institute
Energy use	The Guangdong Techno-economy Research and Development Centre (GDTE)
Industrial production process	The Guangzhou Institute of Energy Conversion, Chinese Academy of Science (GIEC)
Agriculture	The Guangdong Academy of Agricultural Sciences (GDAAS)
Changes in land use and forestry	The Guangdong Academy of Forestry (GDAF)
Waste	The Guangdong Academy of Environmental Sciences (GDAES)

Source: Author's fieldwork.

7.4.3 Co-production: experts defend Guangdong's inventory data during the centre's examination

In terms of the procedure of bottom-up reporting of emissions data and top-down supervision, the GD-DRC along with the participating experts initially submitted the report and presented the methodology, data, and investigation result of Guangdong's EI to the central government. Thereafter, the NDRC officials and the review committee composed of at least five selected leading experts (mostly from semi-official research institutes or top universities in Beijing) carefully examined the report and verified the document (Chen, 2017: 370; Interviews 53 and 60). While the central government and review committee questioned the validity of the inventory data in the review meeting, the Guangdong experts used their expertise and investigation experiences to defend the specified inventory data (Chen, 2017: 370; Interviews 53 and 60).

7.4.4 A higher degree of policymakers' demand and experts' policy impact

Since there is a high threshold of expertise for emissions inventorying and the provincial officials lack expertise, experts enjoy a higher degree of policy impact on Guangdong's Emission Inventory. Thus, more than providing technical support to the officials, experts are undertaking substantive work for the officials (Chen, 2017; Interviews 50, 60, and 61).

7.5 Case III: Guangdong Province's pilot emissions trading scheme (ETS)

This third case for analysing SPI in Guangdong's climate governance is the pilot ETS.

Concerning the relationships between science and politics, all the three models of SPI can explain the experts' engagement with Guangdong's ETS. Regarding the experts' impact, they played a critical role in almost all the stages of the policy cycle except policy implementation (between levels 4 and 5).

7.5.1 Pilot ETS: the most labour-intensive policy programme

One year after launching the LCPPP, the NDRC launched the pilot ETS and approved two provinces and five cities as pilot regions in October 2011. The central government required the preparation and launch of the seven pilot ETS programmes within three years. This is a short time frame considering that even the EU-ETS was fully operational after more than seven years of preparation (Zhang et al., 2014: 9; Chen, 2017: 371). Hence, the pilot ETS was labour-intensive, requiring much input from experts (Chen, 2017; Lo et al., 2018; Lo and Chen, 2019; Chen and Lo, 2020).

In terms of the problem type, Guangdong's pilot ETS allows examination of the SPI in a moderately structured problem (ends). Since provincial policymakers showed great interest in promoting the ETS, there are no controversies regarding the goals and values. Yet, there was a systematic lack of knowledge since all Chinese localities were at the infant stage in experimenting with the market-based policy instrument. It is through the process of 'learning by doing' that the Guangdong experts developed sufficient knowledge to assist the government with designing and establishing the entire system (Interviews 54 and 55).

7.5.2 Science-push: experts lobby both provincial and central officials to launch the pilot ETS, and organise training sessions for local actors

Similar to the experience of the LCPPP, the Guangdong experts played a vital role in the entire process of Guangdong's ETS. At the initial stage, experts lobbied the Guangdong officials to experiment the pilot ETS. Then, they helped the Guangdong officials express strong political will and preparation for running the pilot ETS to the central government. Meanwhile, experts trained relevant agencies and personnel to participate in the ETS, as well as disseminated the concept of carbon trading to local enterprises to improve their policy compliance (Chen, 2017: 371; Interviews 50, 53, 54, 56, and 60).

Regarding capacity building, the Guangdong experts organised more than one hundred training sessions to ensure that the officials and covered industries learnt to participate in the ETS system since 2011. Although the Guangdong officials showed great interest in promoting and constructing the ETS, local enterprises had a limited understanding of such market mechanisms, and thus showed little interest in trying out

the new system (China Climate Change Info-Net, 2014; Interviews 55 and 65).⁵⁷ This indicates that at the local level, the learning pace of the private sector is slower than that in Beijing (Chen, 2017: 371; Interviews 54, 55, and 65). The experts' scientific input for capacity building was critical to carry out the Guangdong ETS pilot since local stakeholders, in general, lack basic knowledge on running this market mechanism (Interviews 51, 54, 58, and 65).

7.5.2 Policy-pull and co-production: experts contributed to institutional design and establishment of the Guangdong ETS

When the NDRC promulgated the ETS pilot in two provinces and five cities by the end of 2011, the preparation and launch of the seven pilots were set to occur in under three years. Hence, since 2012, a considerable number of expert institutes joined the institutional design and establishment of the Guangdong ETS. Only one year later, the Guangdong pilot ETS was launched in December 2013.

In order to accelerate the establishment of the Guangdong ETS, in 2012 the GD-DRC established the Leading Group of Guangdong Provincial Emissions Trading Scheme and the Task Force on Designing the Guangdong Provincial Emissions Trading Scheme. While the GIEC experts led the Task Force, experts from GDASS, SYSU, GDCC, GDTE, and other research institutes were involved in designing the Guangdong ETS (Interviews 50, 53, 54, and 60). With the assistance of experts, the Guangdong Provincial Government not only promulgated the *Work Plan for Guangdong's Emissions Trading Scheme Pilot Programme*, but also established the China Emissions Exchange at Guangzhou (CEEX) to prepare for the daily operation of the ETS (Chen, 2017: 371).

Although the GIEC led the expert institutes in the initial stage of developing Guangdong's pilot ETS, the SYSU incrementally took over the GIEC's leading stance and assumed most policy work from the Guangdong government. In order to seriously address climate policies, the Guangdong government established the Division of Climate Change (DCC) under the GD-DRC in early 2014. Since the SYSU experts devoted a vast workforce and time for preparing the pilot ETS, the DCC further co-built the Guangdong Research Centre for Climate Change (GDRCCC) with the SYSU in 2015. Since then, the GDRCCC has become the most prominent expert team and operates as a technical arm of the DCC. While the workload has increased, the GDRCCC has expanded from around twenty to thirty to approximately sixty employees. Four members of the GDRCCC, including its director,

⁵⁷ According to a survey undertaken by the GDASS in 2013, whereas 81% of the surveyed enterprises said that they are quite knowledgeable about energy conservation and emissions reduction, more than half (52%) of the surveyed enterprises responded that they did not understand systems such as 'carbon auditing' or 'carbon trading' (China Climate Change Info-Net, 2014; Chen, 2017: 371).

were ‘temporarily transferred’ (借調 *jie diao*) (see 3.5.4.2 for explanation) to be government administrators at the DCC (Chen, 2017: 365; Lo and Chen, 2019: 4; Interview 56). Before the four SYSU employees joined the GD-DRC’s DCC, the DCC only had six staff. Due to the vast size of Guangdong Province, the officials were over-loaded to conduct climate policy in the province. Hence, after joining the Division as employees to work with the officials, the expert-officials provide much more administrative support than scientific advice:

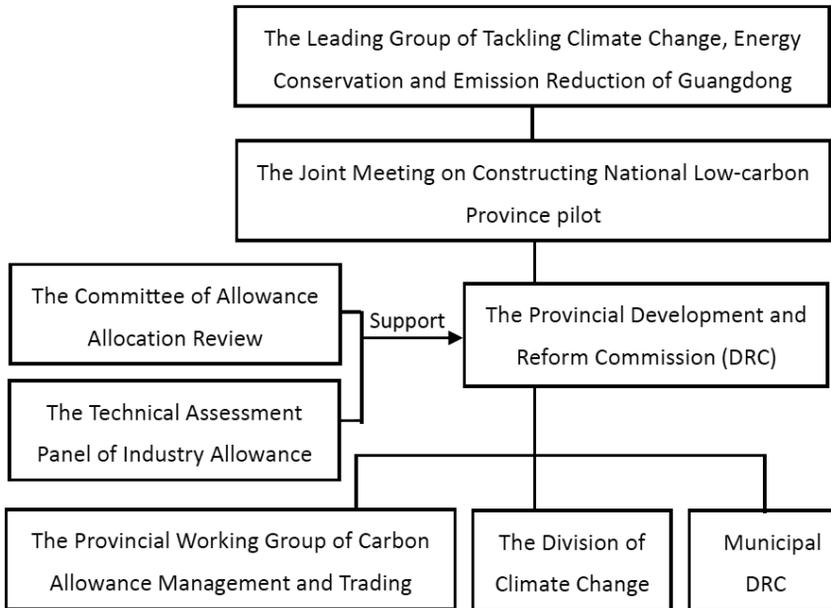
The main task of the officials is to distribute the work into different parts for relevant governmental and public institutes. Such institutes undertake the actual mission, and the duty of the officials is coordination as well as management. Our four employees contribute to mainly trivial things and daily operations, such as contacting and coordinating different stakeholders, including the enterprises.

(Interview 56)

When the Guangdong ETS system was established, most expert institutes took a backseat, and the CEEX was in charge of its daily operation. Yet, the system provides space for experts to participate in other parts of the ETS (see *Figure 7.1*). For instance, under the supervision of the provincial government, the GD-DRC selected personnel from the GDRCCC and other relevant institutes to establish the Provincial Working Group on Carbon Allowance Management and Trading to deal with the allowance allocation of carbon emissions. In addition, some leading experts serve as coordinators or even assume the positions of heads of working groups and committees in Guangdong’s ETS management system (Interviews 51, 52, 53, 54, 55, and 56).

Apart from the allowance allocation, procedures for monitoring, reporting, and verification (MRV) of carbon emissions are necessary. Hence, another category of experts joined to exert their influence. Based on expertise related to supervision, inspection, certification, and accreditation, experts at the China Quality Certification Centre (CQC) Guangzhou Branch and the CEPREI Calibration & Testing Centre (CEPREI) helped design the procedures and regulations on emissions reporting, auditing, and verification, and on training third-party organisations to conduct the inspections. Additionally, they also contributed by double-checking the verified results of the third-party organisations (Chen, 2017: 366, 371; Interviews 53, 56, 60, and 65).

Figure 7.1 The Emission Trading Scheme Management System of Guangdong Province



Source: Author developed from GDRCCC (2016: 13).

7.5.3 A higher degree of experts’ policy impact on Guangdong’s ETS

Since the ETS is a complex market mechanism that requires various kinds of expertise, the Guangdong officials leave space for experts in constructing and running the Guangdong ETS. Hence, while the experts enjoy a higher degree of policy impact at the stage of policymaking and implementation in the LCPPP and EI, they even have an impact on the stage of policy evaluation to successfully enable policy change.

One example of experts enabling policy change is the adjustment of the allowance allocation of the Guangdong pilot ETS. This ETS is the first among the seven pilot regions to auction carbon credits, organised on a quarterly basis (Fu and Wu, 2015). Previously, the allowance allocation was conducted through a combination of auctions and free allocations. During the 2013-2014 compliance period, the ‘benchmarking method’ was adopted for the power, cement, and iron and steel industries, while the ‘grandfathering method’ was adopted for the petrochemical industry (Chen, 2017: 372). To fill the gap between the allowance allocation and the actual demand resulting from economic

fluctuations,⁵⁸ a group of experts proposed that the benchmarking method should replace the grandfathering method during the operation of the Technical Assessment Panel of Industry Allowance. After the Panel's submission of the adjustment proposal, the Guangdong government accepted the proposal. Hence, since the 2015 compliance period, the Guangdong ETS has adopted the new methodology for allowance allocations (Chen, 2017: 372; Interview 60).

7.6 Contextualising SPI in China's provincial climate policy

After presenting Guangdong experts' involvement in three policy programmes, this section illuminates the intersection of science and China's provincial climate policy.

7.6.1 Attributes of the research institutes explain who has more policy impact and on which stage of the policy process

Rather than only focusing on agenda-setting and policy formulation, my research extends the understanding of experts' engagement with virtually all phases of China's provincial climate policy. It shows that research institutes with varied expertise are influential in different pilot programmes and in different stages of the policy process.

Table 7.2 lists the key research institutes and their contributions to three pilot programmes in Guangdong Province. At the infant stage of Guangdong's climate policy development, the GIEC has been devoted to capacity building and policy formulation. In terms of the GHG emissions inventory, the GDTE is the coordinator that leads the task force to undertake the investigation and data collection work. Regarding the institutional design and establishment of the Guangdong ETS, the SYSU plays the dominant role in the policy dynamics.

It is reasonable that different expert institutes contribute to different stages of Guangdong's climate policy cycle. Since each institute has its professional expertise, each can provide policy-relevant knowledge to the officials to cover different aspects of climate governance. For instance, the GDTE provides the Guangdong government with strategic plans related to energy and technology development and has more connections with the industries, including the power sector. Hence, it is an ideal coordinator to lead all research institutes in fulfilling the work of Guangdong's EI (Interviews 53 and 60).

⁵⁸ For example, if the amount of emissions emitted by a factory with a coal-fired CHP unit decreases due to an economic recession, it is not the factory's effort to reduce its emissions; however, according to the 'grandfathering method,' the allowance for this factory will change accordingly (Chen, 2017: 379).

Table 7.2 Influential research institutes and their contribution to different stages of Guangdong's climate policy cycle

	Problem definition	Agenda-setting	Policy formulation	Policy implementation	Policy evaluation
Example I: Low-carbon province pilot programme (LCPPP)	GIEC		GIEC; GDCC; SYSU	SYSU	N/A
Example II: GHG Emissions inventory (EI)	GDTE; GIEC		GDTE; GIEC	GDTE; GIEC; GDAAS; GDAF; GDAES	N/A
Example III: GHG emissions trading scheme (ETS)	SYSU; GIEC; CQC, CERPEI, GDASS; GDTE		SYSU; GIEC; CQC; CERPEI; GDASS; GDTE	N/A (the CEEX is in charge of implementation)	SYSU

Source: Author's fieldwork.

7.6.2 The change of local officials' needs, preferences, and trust of research institutes explains the change of influential experts

Apart from the attributes of research institutes, the demand of local officials in various stages of the policy cycle explains why some research institutes lose their influence and some remain influential in Guangdong's climate governance. My field research echoes the previous literature that the changing need, preference, and trust of the officials explains the changing influence of research institutes in Guangdong's climate governance (Lo and Chen, 2019).

At the earlier stage of the policy process, what provincial officials need is advisors and consultants with expertise that help them with generating plans and guidelines. More specifically, local officials need 'technical advisors' who specialise in project-level advice and can conduct policy-related research. Hence, the GIEC, GDASS, GDTE, and some institutes with robust research capacity played a vital role in this period (Chen, 2017: 4; Lo and Chen 2019: 8). During the period in which the GIEC enjoyed the closest relationship with the GD-DRC, the GIEC and its subsidiary organisation—the Guangdong Low-Carbon

Development Promotion Association (GLCDPA),⁵⁹ effectively acted as ‘a small team’ that belongs to the GD-DRC before the GD-DRC officially established the DCC in 2014 (Lo and Chen, 2019: 10).

When moving from policy planning to the policy implementation phase, what government officials need is practitioners that can help them with the daily operation of the policy programmes (Lo and Chen, 2019; Interviews 56, 60, and 61). In this stage, the GD-DRC found that the GIEC experts “are too specialised, mostly PhDs and professors; their role is limited when it comes to daily operation” (Lo and Chen, 2019: 9). Also, a leadership change resulted in the reconfiguration of the connections between officials and expert institutes. When the GD-DRC established the DCC in 2014, the DCC’s new directors were more familiar with and confident in the experts employed at the GDRCCC in the SYSU (Lo and Chen, 2019: 10; interviews 56 and 60). Incrementally, those previously influential expert institutes, such as the GIEC, GDASS, and GDTE, are not on the new leadership’s preference list (Lo and Chen, 2019: 10).

Yet, as asserted by many informants, each research institute has its research focus and development agenda; working with government officials to support policymaking and implementation is only one of their goals (Interviews 50, 51, 52, 59, 61, and 62). While researchers employed at universities are good at and more familiar with producing scientific knowledge and academic papers, they can be unfamiliar with generating administrative/bureaucratic knowledge and policy briefs for government officials. Further, considering the various styles of experts when carrying out a policy-oriented project, they are at the same time learning how to communicate with government officials during the collaborative process. Hence, those research institutes that prefer to focus on academic performance rather than providing practical assistance to officials have withdrawn themselves from the line of expert teams that supports local climate governance (Interview 60).

7.6.3 Provincial officials are more concerned with political achievements than with professional expertise due to the target responsibility system

Since the experts’ policy work takes place in accordance with the instructions of provincial officials, two-way communication between experts and officials occurs when they undertake the projects. While experts focus primarily on scientific and evidence-based policymaking and provide professional advice to provincial officials, the officials focus

⁵⁹ The GLCDPA is one of the associations that was established by expert institutes (e.g., GIEC) due to the mandate of the Guangdong government to approach the public to accelerate the idea dissemination of ‘low-carbon development’ and the local’s compliance with the climate-related policies.

more on political achievement due to the current Party-state's target responsibility system (TRS) set for local cadres (K. Lo, 2015; Chen, 2017; Interviews 61 and 62). Hence, rather than scientific advice, provincial officials consider political factors and the balance between climate and other policies.

As agents of government officials, experts have to report their working progress regularly and ensure that their directions and preliminary results meet government officials' expectations. Once they receive feedback or further directives from officials, experts are expected to adjust their activities accordingly (Chen, 2017: 373; Interviews 50, 52, and 56). Since officials and experts may think differently, the communication dynamics becomes critical to carry out a policy project.

In my field research, I asked my interviewees about the most common type of questions or comments that government officials raised regarding projects. Most informants replied that, usually, officials do not provide professional comments on specific policies, but inquire about the extent to which the policy measures meet all of the requirements set by the central government, their timely completion, and their achievability (Chen, 2017: 374; Interviews 50, 51, 52, 53, 54, 56, and 60). As the SYSU expert explained,

The officials considered the projects from the viewpoint of political achievements. The comments they gave to us were based on the accomplishment of their target responsibilities. Comparatively, professional expertise and other considerations are seldom taken into account due to the officials' limited energy.

(Interview 56)

Considering the TRS in the Chinese Party-state, local cadres have to pay particular attention to policy components that are vital for their performance appraisal (Kostka and Hobbs, 2012; Ran, 2013; Qi, and Zhang, 2014). Even if the policy is not yet inscribed as a specific target, once local officials recognise it as one of the 'main priorities' on the Chinese political agenda, they are inclined to actively fulfil such policy work. The trend of implementing the low-carbon province/city pilot programme and the pilot ETS are both cases in point—the task of local experts in this regard is to assist local officials with echoing the 'main melody' (主旋律 *zhu xuan lu*) (Chen, 2017: 374; Interviews 52 and 56). Many interviewees pointed out the political significance of the carbon ETS pilot stressed by the NDRC. Since the carbon ETS pilot transmitted intense top-down political pressure, there is internal pressure (内压 *nei ya*) that pushes local officials and experts to ensure the

accomplishment of the policy programme (Interviews 52, 54, 55, 65, and 67).⁶⁰

7.7 Inferences

This chapter has set out to answer the question of *how do experts engage in China's provincial climate policy, and how do policymakers demand and accept the experts' input?* In assessing how experts engage in China's provincial climate policy, and how policymakers demand and accept the experts' input, my case studies reveal that all the three SPI models—science-push, policy-pull, and co-production—can be applied to explain SPI in Guangdong's climate governance. Regarding the policymakers' demand for the experts' input, the common condition of the three cases is the central government's demand for the local's urgent action, and the local's lack of capacity in general. On the one hand, provincial officials' lack of knowledge and capacity for deploying climate change-related policy explains that instead of scientific knowledge, they demand more administrative knowledge in the policy cycle. On the other hand, rather than professional expertise, provincial officials consider political achievement and accomplishment of their target responsibilities more strongly.

⁶⁰ The interviewees also mentioned the sulphur dioxide (SO₂) ETS pilot as a negative case. During the early 2000s, the National Environmental Protection Agency (NEPA) promoted the SO₂ ETS pilot in more than ten provinces (including Guangdong) and cities. However, NEPA is relatively weak among the centre ministries, indicating little pressure it could transmit to Chinese localities. Local officials were somewhat reluctant to experiment with the pilot programme. Hence, the SO₂ ETS has not been built as a national system until now (Interviews 58, 59, and 67).