Embassy
of the Federal Republic of Germany
Beijing

# Mapping China's Climate Policies

June 2017 Edition

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中国碳论坛

*An independent platform to foster trust and cooperation among China's stakeholders for climate action*

Report prepared by Development Technologies International for the China Carbon Forum under a grant by the Embassy of the Federal Republic of Germany in Beijing.

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## Executive Summary and Foreword

China is universally acknowledged as essential to shaping the outcomes of the international climate negotiations. It is the world's largest emitter of greenhouse gases on an absolute basis and its emissions on a per capita basis surpass those of the European Union. China's actions, along with those of other major economies, will determine the future of our planet. In the negotiations that culminated in the Paris Agreement and the discussions that follow to implement it, China has assumed a proactive posture advancing its positions through multilateral and bilateral diplomacy, its ongoing efforts to curb its greenhouse gas emissions and adapt to climate change, and pledges of financial and other support for other developing countries.

This report aims to assist those from government, industry, and civil society interested in better understanding China's policy formation process concerning climate change. Its primary aim is to identify the key organizations within and outside China's government responsible for shaping its climate policies. In general, we focus on clusters of stakeholders and how they engage with one another. The specific stakeholders involved in the formation of climate policies vary based on the underlying substantive issues and choice of technology.

In this third version of *Mapping China's Climate Policies*, we expand our analysis by adding three new chapters. Our analysis of China's June 2015 submission to the UNFCCC of its nationally determined contribution (NDC) *Enhanced Actions on Climate Change* is now a stand-alone chapter that provides comprehensive analysis of China's negotiation positions and interventions at the UNFCCC and the International Civil Aviation Organization since the submission of its NDC. We add a chapter examining China's substantive energy and environmental policies essential to meeting climate change goals. Finally, a new chapter analyzes why and how climate change has emerged as a central theme in China's foreign policy.

We believe that China's climate policies are developed based on consensus of stakeholders inside and outside government that are led by a dominant agency of government. In most cases, the dominant agency is the National Development and Reform Commission (NDRC), possessing formal responsibility for leading and coordinating China's international climate negotiations efforts, and coordinating domestic climate policy amongst ministries. The NDRC exerts tremendous political power both through its role leading the negotiations and coordinating climate policy, and through its broader responsibilities for China's economic development. Other government ministries and provincial governments exert varying degrees of influence over China's climate policies depending upon the issue. Important examples of stakeholders outside of government that influence the formation of China's climate policies are state-owned industry, exerting influence through economic power, and expert organizations such as China’s major universities, exerting influence through their expertise and ability to inform and legitimize political and economic positions.

We identify "clusters" of policymakers that contribute to the formation of specific substantive climate policies - such as policies relating to climate mitigation, adaptation, technology transfer, and finance - as well as policies relevant to broader state interests implicating foreign relations. The specific stakeholders involved in developing consensus on climate policy for each substantive area depends on a number of factors, including competence of different agencies for administering applicable laws and regulations, lines of political authority within government

and Party, technical expertise, and choice of technology for addressing the particular climate issue.

Recent statements on climate change by high-level leaders in the Chinese Communist Party and the government suggest that climate policy has emerged as a political priority for China. President Xi's participation in China-US climate cooperation summits, his announcement that China will establish a national carbon market in 2017, and China's recent commitments to step up funding for South-South cooperation to fight climate change confirm that climate policy will be led by China's top leaders.

Top leadership engagement on climate change represents a transition from a predominantly technical policymaking process at the government level to high profile political decision making led by the Party and government officials at the highest levels. The shift in climate policy from the technical towards the political realm is likely to intensify as China faces increasing pressure in international negotiations to reduce its greenhouse gas emissions. As part of this shift, we see climate change more fully integrating with China's broader development assistance and foreign policy strategies with respect to G-77 countries in its climate negotiating alliance. The integration of clean energy, climate and sustainability themes in China's One Belt One Road strategy is the culmination of climate change emerging as a pillar of China's broader foreign relations.

This report has mainly confined its analysis to domestic Chinese organizations of the Communist Party of China, the government, state-owned industry and expert organizations. In the third version of the Climate Map, however, we also consider the role of specific foreign and domestic NGOs and intergovernmental organizations in limited cases where these organizations have been so instrumental in influencing policy development that failure to report their participation would result in an incomplete understanding of the dynamics shaping policy. This is an extremely high bar. Thus, general coverage of NGOs and intergovernmental organizations is not the focus of this report, nor is our purpose to evaluate the relative contributions or impact of NGOS. Thus, although we see persuasive evidence that intergovernmental organizations and NGOs are collectively playing a significant role in supporting the development of policy, shaping opinion, and providing financial and technical support for projects and policies, we regret we cannot recognize all of these organizations by name in this report.

In preparing this document, we researched information from public resources, including Chinese government documents, UNFCCC records, news reports, academic papers, trade publications and other published materials in English, Chinese and French. In addition, we reviewed the composition of Chinese delegations to foreign countries and agendas of state-sponsored and other important conferences. We conducted interviews with stakeholders and experts who are knowledgeable about the international climate negotiations and China's climate policies to confirm information and develop our findings.

The third version of this report comprises ten chapters organized in three sections: stakeholders and policy formation process, policies, and future strategy. In Part I: Stakeholders and Policy Formation Process, Chapter 1 provides an overview of China's central government, setting out the main stakeholders engaged in climate policy formation at the national level. These include government and non-governmental actors such as industry and expert organizations. Chapter 2 summarizes key Party organizations and leadership task forces engaged in climate and environmental policy. It explains how the Party leads government policy processes. In Chapter 3, we analyze the NDRC and institutions specializing in climate policy

associated with the State Council, as these institutions are the locus of China's climate negotiation efforts. Chapter 4 focuses on expert organizations and Chapter 5 on industry stakeholders. Chapter 6 presents our understanding of different climate policy formation "clusters" around specific issues. In Part II: Policies, Chapter 7 reviews and evaluates China's positions at the UNFCCC and other international fora, including China's NDC, how the NDC was developed and its relationship to China's five-year planning process. Chapter 8 reviews China's main climate, energy and environmental policies that have a bearing on its ability to meet its NDC. This part also examines how China's efforts to control greenhouse gas emissions may be integrated with its efforts to improve air quality, and implications for coordination among stakeholder ministries. In Part III: Future Strategy, Chapter 9 examines the imperative for China to take immediate action on climate and how China's efforts to advance climate policies have emerged as a foreign policy strategy. Chapter 10 concludes by considering the future of China's climate policy formation process and how it might influence China's broader reform agenda, its foreign relations, energy policy, and the critical step of local implementation of its NDC to achieve its pledges to the international community.

**Acknowledgements**

The authors thank those individuals in government, industry and civil society organizations who shared their insights and reviewed earlier drafts of this study. In particular, we thank Ms. Rebecca Nadin for providing insights and materials on China's adaptation strategy; Ms. Coraline Goron for sharing her research on electricity reform; Mr. Cyril Cassisa for contributing data for a prior version of this report; and Mr. Cassisa, Mr. Dimitri DeBoer and Mr. Hugh Kater for reviewing prior versions of this report. Mr. Kater assisted with the production of the first edition of this report, and Peter Edwards assisted with the production of the second and third editions. The Royal Norwegian Embassy, Beijing and the Embassy of the Federal Republic of Germany in Beijing provided financial support for earlier versions of this publication.

**Note**

The views expressed in this report are those of the authors and do not necessarily represent those of the Government of the Federal Republic of Germany, or of the China Carbon Forum.

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## 1. Overview of China's Government and Climate Policy Stakeholders

The government of the People's Republic of China (China) is composed of the National People's Congress, the executive State Council, the President, and the Premier. Legislative and executive office holders are appointed for five-year terms. Mainland China comprises 22 provinces, four municipalities directly under central government control, five autonomous regions, and the special administrative regions of Hong Kong and Macau. Except for the special administrative regions which have unique governance arrangements, each of these political subdivisions elect local people's congresses and are administered by people's governments

China's form of government is a unitary system combining the legislative, executive, and judicial functions in a single executive organ. The system is intended to work in unison, sometimes with shared responsibilities over certain functions.

The National People's Congress is a legislative body and the highest organ of state power. The National People's Congress comprises 2,989 delegates that are selected from provinces, municipalities, autonomous regions and the armed forces. The National People's Congress approves the President and members of the State Council, as well as the members of the Standing Committee of the National People's Congress, which meets when the National People's Congress is not in session. In practice, the powers of the National People's Congress are exercised by its Standing Committee and the State Council, as further described below.

In addition to the National People's Congress, there are local People's Congresses at the provincial, city and county levels. The bodies have four main functions and powers: legislation, supervision of the implementation of laws, appointment and removal of officials, and making decisions on major issues. All administrative, judicial and prosecutorial organs of the state are created and supervised by a People's Congress at the corresponding level.

Each People's Congress is a single house legislative body. Representatives of the national and local People's Congress serve on a part-time basis and are elected for 5-year terms. The deputies to congresses at the county and township levels are elected directly by their constituencies. Deputies to the National People's Congress and to the People's Congresses of provinces, autonomous regions, municipalities directly under the Central Government, cities divided into districts, and autonomous prefectures are elected by the people's congresses at the next lower level (Article 2, Electoral Law of the National People's Congress and Local People's Congresses of the People's Republic of China, as amended through March 14, 2010). There are approximately 2.8 million deputies to the people's congresses at all levels nationwide.

The National People's Congress meets in session once a year, and local people's congresses meet at least once a year. The National People's Congress may not exceed 3,000 deputies pursuant to the Electoral Law of the National People's Congress and Local People's Congresses of the People's Republic of China. Due to the size of the National People's Congress, and the part-time status of its deputies, the National People's Congress Standing Committee was established pursuant to the Constitution to exercise national legislative functions when the National People's Congress is not in session. The Standing Committee has the right to propose bills to the National People's Congress and to revise existing laws without the approval of the National People's Congress. People's Congress deputies have the right to propose bills.

The **Communist Party of China** (CPC), described in Chapter 2, is China's dominant political party and the only party to have been in power since China's founding in 1949. The Political Bureau of the CPC Central Committee (Politburo) sets policy and controls important administrative, legal and executive government appointments. The Standing Committee of the Politburo leads the Party and, in turn, the country.

Certain government ministries play a major role in the development of climate change policies. Key government ministries and agencies include:

**State Council** is the chief administrative authority of the People's Republic of China. The State Council is chaired by the Premier and comprises the approximately 50 heads of governmental departments and agencies. The State Council supervises the various subordinate provincial governments. In practice, the State Council acts through the National Development & Reform Commission with respect to regulation of the economy.

**National Development & Reform Commission** (NDRC) is responsible for developing policy and regulations that affect the national economy and guiding economic reform. NDRC is responsible for drafting the national energy development strategy; implementing planning, policies and standards in the energy and other industrial sectors; developing new energy and promoting energy efficiency; and developing climate change policies. It is responsible for greenhouse gas accounting regulations and leads China's efforts to develop a national carbon market. The NDRC acts for the State Council in reviewing and approving infrastructure projects throughout China. The departments of the NDRC and the National Energy Administration, an independent agency within NDRC, engage in developing climate policy and are described in greater detail in Chapter 3 of this report.

**Ministry of Foreign Affairs** (MOFA) is responsible for China's international relations and has special responsibilities and expertise in negotiating treaties. MOFA shares responsibilities with the NDRC for the climate negotiations.

**Ministry of Finance** (MOF) is responsible for budget and tax management, including administering environmental resource taxes. MOF approves all borrowing from international organizations, such as the World Bank and Asian Development Bank. MOF is also responsible for the CDM fund, which collected a fraction of all CDM revenues and aims to promote energy efficiency and renewable energy. The MOF plays a "cluster-leading role" on financial issues in the climate change negotiations.

**Ministry of Environmental Protection** (MEP) is China's national environmental policy and enforcement body. It is responsible for drafting and implementing environmental protection planning, policies and standards. It is not responsible for carbon emissions, as those are not classified as a pollutant in China. Within the MEP, the Department of Science, Technology and Standards is responsible for climate change policy matters.

**Ministry of Science and Technology** (MOST) is the lead agency in preparing China's science and technology development plans and policies, drafting related laws and regulations, and implementing the country's basic and applied research programs. MOST administers several national R&D initiatives that fund applied research for technologies important to climate mitigation and adaptation, especially in the carbon management area.

**Ministry of Industry and Information Technology** (MIIT) develops and implements planning, policies and standards, and monitors daily operations for the industrial sector. It is tasked with accelerating the development of indigenous innovation of technologies, as well as driving industrial water conservation and energy efficiency.

**Ministry of Land Resources** is responsible for developing policies, regulations and standards for land, mineral and marine resources (Ministry of Land Resources, 2017). The Ministry of Land Resources plays a cluster-leading role on issues concerning biodiversity in the climate negotiations and potentially plays a secondary leading role in land use issues such as REDD+ negotiations.

**State Forestry Administration** is responsible for China's national forestry affairs. It participates in UNFCCC meetings on REDD+ issues. Forestry is expected to play an important role in China's national carbon market as a means to reduce greenhouse gas emissions.

**Ministry of Agriculture** is responsible for agriculture, fisheries and animal husbandry. It regulates greenhouse gas emissions from rice and livestock, and is a leading agency for rural adaptation policy issues.

**Ministry of Water Resources** is responsible for managing water resources in China. It plays a leading role in China's nascent adaptation efforts.

**Ministry of Housing and Urban Rural Development** is responsible for managing China's urbanization. As such, it plays an important role in eco-city and green technology development for buildings, and leads planning efforts for urban adaptation.

**State-owned Assets Supervision and Administration Commission of the State Council** (SASAC) supervises and manages State-owned enterprises, including China's large power companies and oil and gas companies. SASAC appoints, evaluates the performance of, and removes top executives of the enterprises it supervises (SASAC, 2017). SASAC controls 33 percent of China's total industrial assets nationwide (Zweig, 2015).

**People's Bank of China** (PBOC) is China's central bank and primary financial regulatory body. **China Securities Regulatory Commission** (CSRC) is China's securities regulatory body. As China prepares to implement its national carbon market and green finance policies as set out in the 13th Five-Year Plan, the PBOC and CSRC are becoming increasingly active in market-based climate change policy that operate through financial markets.

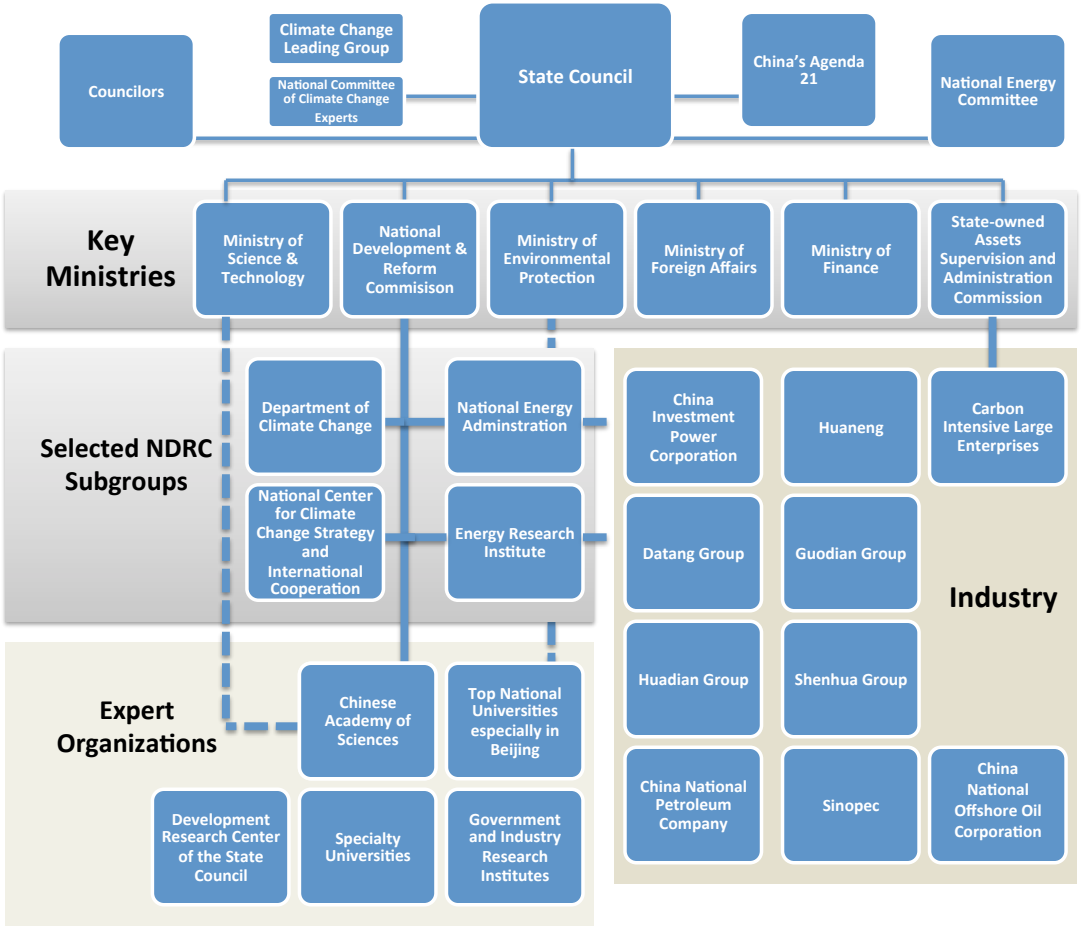
**National Bureau of Statistics** is responsible for compiling, processing and publishing China's official statistics, including those relating to economic activity and greenhouse gas emissions.

In addition to these ministries, the Chinese government has formed several groups specialized in energy and climate change policy coordination and support: the **National Energy Committee** comprised of members of each of the major government ministries and agencies, the **Climate Change Leading Group** created by the State Council, and **China's Agenda 21**. These groups are described in greater detail, together with the NDRC, in Chapter 3 of this study. In addition,

the State Council is advised by the **National Committee on Climate Change Experts** and individual Counselors, typically senior Party members and government officials who advise in an individual capacity. The **Chinese Academies, China Meteorological Administration** and the **Development Research Center of the State Council** are prominent government expert organizations that, along with the university system, support government ministries in developing climate change policy. The **China Meteorological Administration** and the **State Oceanic Administration** are also leading expert agencies in China's adaptation planning. These expert organizations are described in Part 4 of this study.

The diagram below shows selected central government entities and stakeholders that would be involved in formation of climate policy in China. We identify agencies, departments and institutes that are part of or affiliated with the NDRC and exist primarily to assist it in carrying out its duties. Regional or local government entities are not shown on the diagram. Dashed lines represent funding or collaborative relationships, as opposed to reporting lines. The industries presented on the diagram are among the most carbon-intensive and are for illustrative purposes only; they are not intended to be exhaustive.

**Figure 1: Overview of Major Climate Policy Formation Organizations**




Source: Authors' analysis

## 2. The Party and its Relationship to Government

Understanding China's policymaking process requires understanding the role and operation of the Communist Party.

As a single party state, the Communist Party maintains a monopoly on political power within China.[1] The General Secretary of the **Political Bureau of the CPC Central Committee** (the Politburo) (中国共产党中央委员会总书记) is the highest Party official. Under the Party's Constitution, the General Secretary must be a member of the Party's Politburo. Starting with Jiang Zemin, the General Secretary of the Communist Party of China has held two key government positions - the Chairman of the Central Military Commission (中央军事委员会主席), making him commander-in-chief of the People's Liberation Army, and the President of the People's Republic of China. The Premier controls the civil bureaucracy, a powerful position, and usually serves as the number-two position in the Party leadership.

The present Politburo has 25 members comprising the Politburo Standing Committee members, the Vice Premiers, Party chiefs of major provinces, and high-ranking Party officials with responsibilities for such matters as military affairs, propaganda, and legislation.

The Politburo Standing Committee comprises the top leaders of the Party, most of who also hold top government leadership positions. The Politburo Standing Committee is regarded as the top-decision making body in China. The committee presently has seven members and has had as few as five members. The committee meets once a week every Wednesday morning and makes decisions by consensus (Personal communications, November 14, 2015). Each member is responsible for a portfolio covering a major governance system, grouped in clusters, generally as follows:

- Party affairs - party matters and relations with other Communist parties;
- Organizational affairs - allocation of party positions;
- Propaganda and education - news organizations and universities;
- Police and legal affairs - police organizations, courts, social campaigns;
- Economic development, natural resources and the environment;
- Finance and economics - led by the Prime Minister; and
- Military - controlled by the President.

We believe that China's strategic decisions concerning climate change are made or approved by the Politburo Standing Committee, with the assistance of the leading groups and task forces described below.

[1] Eight other small political parties operate in China. These parties supported the Communist Party in World War II against the Japanese (1937-1945) and the civil war against the Kuomintang (1945-1949) and today form a "multi-party cooperation system". These political parties do not compete for power or stand in opposition to each other, but rather are "partners" supporting the Communist Party by providing a forum for consultation on policy matters.

The Politburo appoints leadership small groups from among its members that study and develop policy in areas important to strategic planning and governance of the country. These high-level groups are intended to lead the various bureaucratic and economic stakeholders in complex policy areas towards consensus positions consistent with the views of the country's top leadership. The Politburo has formed leadership small groups on financial and economic affairs; foreign policy; national security; rural development; Internet and information security; Hong Kong, Macao and Taiwan; and comprehensively deepening reforms.

The most important of the Politburo small groups is the **Central Leading Group for Comprehensively Deepening Reforms** (中央全面深化改革领导小组). The 18th Central Committee of the Communist Party formed the group in 2013 as a policy formulation and implementation body established under the Politburo to deepen and expand China's continuing reform agenda. The group is understood to provide President Xi with the ability to advance his programs through the government bureaucracy and to strengthen his direct control over China's State Council and the government, which is historically the domain of the Premier (Huang, 2013). The Central Leading Group for Comprehensively Deepening Reforms meets periodically and has recently issued a number of published decisions relating to the environment. The **CCP's Central Leading Group for Financial and Economic Affairs** (中央财经领导小组) serves as the top decision making body for energy policy.

The Central Leading Group for Comprehensively Deepening Reforms formed the **Reform Task Force for the Promotion of Economic Development and Ecological Progress** (经济体制和生态文明体制改革专项小组), through which it developed the *Integrated Reform Plan for Promoting Ecological Progress* (2015), an important document that calls for institutional changes to China's government structure to achieve environmental objectives. We understand the NDRC's Environmental Protection and Resources Department served as the coordinating agency supporting the Task Force's work on the *Integrated Reform Plan for Promoting Ecological Progress,* acting in effect as its secretariat for this particular policy document. Other Central Leading Group task forces relating to the environment include the **Ecological Civilization Promotion Task Force** (生态文明促进会), which is coordinated primarily by the MEP, and the **Low Carbon Economic Development and Innovation Task Force** (低碳经济发展与创新), which is coordinated by NDRC. These task forces are comprised of Party leaders, ministry personnel and experts.

The Politburo, with the Politburo Standing Committee as the paramount decision-making body of the Party, working through the Central Leading Group for Comprehensively Deepening Reforms and its various task forces, direct the actions on the government. The State Council and the NDRC, described in greater detail in Chapter 3, implement the policies of these Party decision-making bodies at the highest levels. As noted above, we understand that the NDRC directly supports the Reform Taskforce for the Promotion of Economic Development and Ecological Progress and the Low Carbon Economic Development and Innovation Task Force in developing policy, suggesting that the Party and NDRC work together in an integrated manner, although as distinct entities.

The Party's organizational structure parallels the government at every level - national, provincial, prefecture, county, township, and village. Within towns and cities, Party committees penetrate down to the district and then neighborhood committee levels (Zweig, 2015). A Party branch and Party secretary exists for each government agency, court and legislative body at all levels of government. For example, the CPC National Party Congress corresponds to the National

People's Congress; and the CPC Central Military Commission similarly corresponds to the State's Central Military Commission.

The Party's control over society is operationalized through its structure and control over appointments to government and state-owned enterprise positions through the *Nomenklatura* system. Under this system, the Party possesses the right to appoint and approve individuals to certain government leadership and industry positions on the *Nomenklatura* list. The Party at each level controls the nomination and appointment of key government positions through Party committees corresponding to the level and specific organization of the government. Thus, Party members often hold dual appointment to the government position corresponding to their Party position. Like government positions, Party positions are elected for 5-year terms at each level of government, with elections for Party positions being held several months prior to government transition, enabling the Party to select its leadership for that term and appoint those who will assume corresponding positions within the government.

In addition to the *Nomenklatura* system, the Party guides the behavior of its appointments through the cadre evaluation system, under which targets are set for individual cadres appropriate to their position that are used for determining future advancement. The cadre evaluation system, which traces its own roots to imperial practices, enables the Party to centrally control a government that is otherwise highly decentralized.

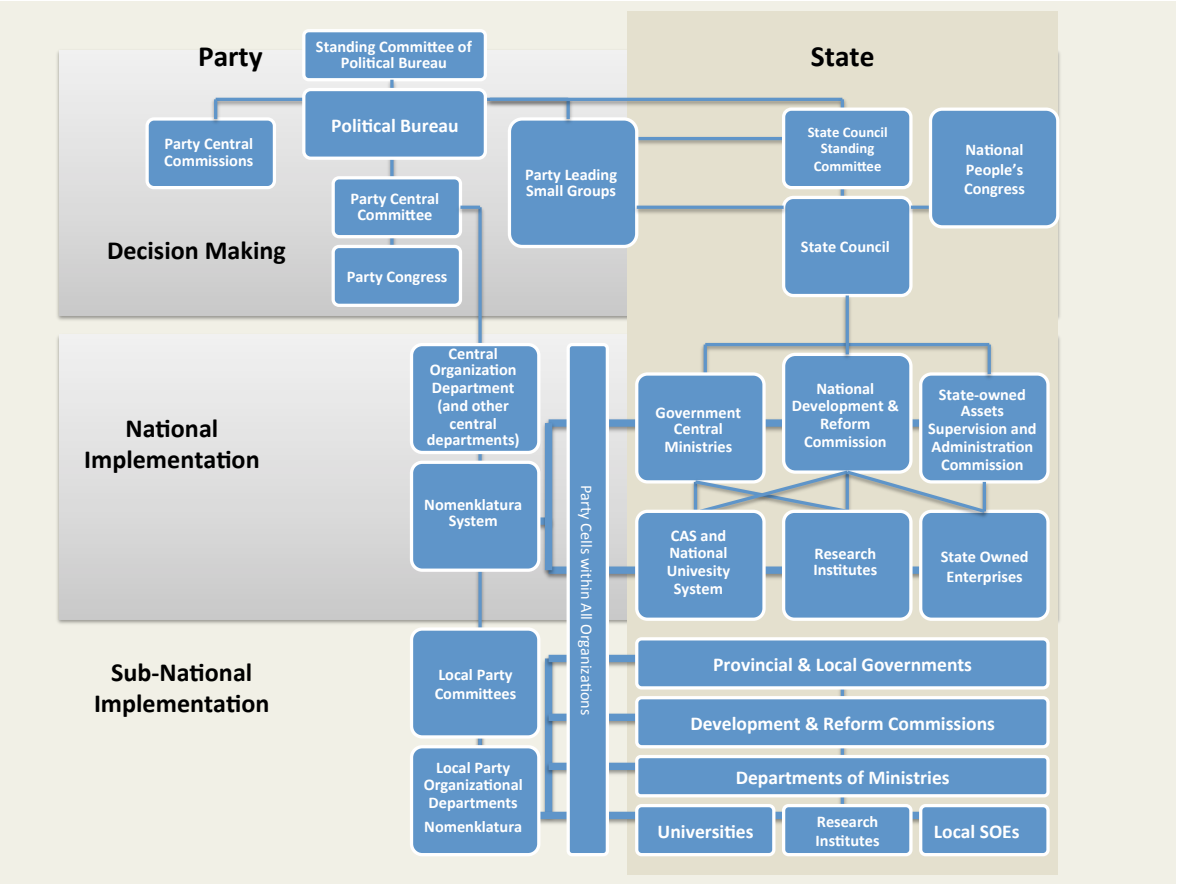
The cadre evaluation system operates in parallel to a distinct system of administrative mandates through which government ministries and agencies set goals for government organs at levels below them. While the two systems should in theory reinforce each other, the Party's cadre system focuses on individuals, whereas the administrative mandate system sets goals for government units, however differences in emphasis and policy between the two systems may exist (Personal communications, October 17, 2013).

Although not described in China's Constitution, the Party *Nomenklatura* system enables it to control the People's Congresses at each level from townships to the national government. Formally, candidates are nominated from among representatives at the congress immediately below the congress being elected (e.g., county representatives may stand for provincial congresses), however candidates nominated by ten or more deputies of the People's Congress may also stand for election, subject to candidate/seat ratios imposed by law (Articles 29-30, Electoral Law of the National People's Congresses of the People's Republic of China, as amended through March 14, 2010). In practice, nominees are restricted to Party–approved candidates drawn from its ranks and people's organizations (Party mass organizations) (Li, 2010: 8-9). By confining the nomination process to those elected to Congresses at the next lower level and limiting the number of candidates to seats, the rules ensure that the Party controls Congresses at all levels.

The legislative process is synchronized to the Party and government appointment cycles in order to ensure Party control over the legislative agenda. The CPC Central Committee defines five-year guidance for the country's legislative plan, mirroring the national five-year plans adopted by the government. In practice, the CPC Central Committee approves all major legislation before being proposed for consideration by the National People's Congress.

The figure below shows the relationships between the Chinese Communist Party and the state.

**Figure 2: China's Communist Party and the State**




Source: Authors' analysis

## 3. NDRC and Climate-Specific Climate Policy Groups under State Council

In this section, we discuss the role of the NDRC as the leading agency for coordinating climate change policies and measures. We also consider three groups associated with the State Council and specialized in climate change - the National Energy Committee, Climate Change Leading Group, and China's Agenda 21.

Based on our research, the **National Development & Reform Commission** (NDRC) is the dominant agency occupying the central position for almost all climate policy issues.

NDRC is subordinate to, and exercises certain powers on behalf of, the State Council. Importantly, the NDRC's department heads or deputy directors hold ministerial rank, and the Director-General of the NDRC thus is half a rank above the ministers of China's other ministries. In this sense, NDRC is a super-agency that coordinates among ministries. NDRC is organized into departments that reflect subject matters that overlap with those other ministries.

The NDRC is responsible for developing policy and regulations that affect the national economy and guiding economic reform. The NDRC is staffed by approximately 900 professionals. NDRC is responsible for drafting the national energy development strategy; implementing planning, policies and standards in the energy and other industrial sectors; developing new energy and promoting energy efficiency; and developing climate change policies. It exercises certain authority on behalf of the State Council, such as the power to approve infrastructure projects throughout China. For example, the NDRC issues power plant licenses for facilities over 25 MW, with smaller plants being approved by the local DRCs. The NDRC also leads China's climate negotiations, is developing greenhouse gas regulation, and is establishing China's future national carbon trading system.

As a result of its responsibilities and relationship to the State Council, the NDRC as an organization is the single most influential government organization shaping China's future greenhouse gas emissions path and China's positions in climate negotiations. Under the NDRC, several departments play potentially important roles for climate change policy development:

> ***National Energy Administration,*** established in August 2008 to replace the National Energy Bureau, studies and drafts national energy development strategies and considers major issues of energy security and development. The National Energy Administration has certain regulatory authority over the oil and gas sector.[2]
>
> ***Department of Climate Change***, established in 2008, drafts and implements industrial planning, policies and standards in the energy sector; and develops new energy and energy efficiency policies. The Department of Climate Change is responsible for implementing China's emissions trading pilots and national trading scheme, developing climate change legislation, and is the subgroup within the NDRC that leads the climate negotiations. The Department of Climate Change is further subdivided into divisions:

[2] The National Energy Administration is often understood to be a ministry-level agency, however it is identified on Chinese government websites as one of the "State Bureaus Under the Jurisdiction of Ministries & Commissions". The NDRC website identifies it as a department of NDRC (See NDRC, 2015). Accordingly, we show the NEA as a department of the NDRC.

- Negotiation
- Policy and Strategy Research
- Domestic Implementation
- International Cooperation
- General Affairs

Under the Department of Climate Change, there are several important focal points for the climate negotiations. We are aware of the following:

- Mitigation
- Adaptation
- Technology Transfer
- Finance
- Market-Based Policies (e.g., carbon markets)
- Legal Frameworks (e.g., form and substance of the negotiation text)

In addition to these two primary departments, two additional departments are potentially relevant to climate change policy formation:

***Environmental Protection and Resources Department*** has jurisdiction over environmental matters as part of NDRC's mandate in leading China's economy and market reforms. We understand this department has, for example, supported the Party's Central Leading Group for Comprehensively Deepening Reforms in developing the *Integrated Reform Plan for Promoting Ecological Progress*.

***Pricing Department*** of the NDRC sets prices for commodities such as coal and oil produced by state-owned enterprises, prices for items purchased by the government, including the military, and prices and subsidies for commodities controlled for price stabilization purposes, such as medicines and foodstuffs. We understand that the Pricing Department sets hundreds of prices and exercises broad discretion. Significantly, we are not aware of any published regulations guiding their decisions. As a result, the Pricing Department controls pricing for a significant portion of China's economy. To the extent climate policy is advanced through market-based mechanisms, it may resist or seek to weaken such efforts. While not a direct contributor to climate policy in the positive sense, the Pricing Department is influential within the NDRC and represents the interests of influential segments of China's economy in policy matters.

In addition to NDRC's departments, several research institutes are affiliated with and, housed in, the NDRC. Although these organizations are part of the NDRC for practical purposes, these organizations fund a portion of their budgetary needs through outside contracts and, as a result, engage with external stakeholders relatively openly. Also, due to their budget arrangements, their staffs do not count against the official NDRC staff allotment.

***National Center for Climate Change Strategy and International Cooperation (NCSC)*** is a research organization recently founded in June 2012 under NDRC that serves mainly as a resource for the NDRC in shaping policies and positions for the international climate negotiations. This group maintains a climate model of the Chinese economy that it uses for testing policy scenarios. The NCSC has expanded rapidly and its personnel are drawn heavily from the NDRC's Energy Research Institute and universities.

***Energy Research Institute (ERI)*** is a research organization within NDRC's Academy of Macroeconomics, which provides macroeconomic research support on energy, transportation, pricing and other topics important to NDRC's economic planning function. ERI focuses on energy and technology policy. It also manages research on energy transition and low carbon development pathways.

***State Information Center (SIC)*** is a research and forecasting institute that undertakes economic studies to support policy decisions concerning climate change. For example, the SIC is studying marginal abatement cost curves for pricing carbon under the planned national carbon market, and researching China's proposed electricity market reform.

The **National Energy Committee** serves as a coordinating body on energy policy. It is chaired by the Premier of China and its membership is comprised of heads of each of the major government ministries and agencies, including minister-level directors of the Bank of China, SASAC, Import Administration, the People's Liberation Army and other commissions and agencies. The NEC acts as a consultative and coordinating body dealing with energy and industry policies. We do not believe it meets regularly nor is it a decision-making body. The National Energy Administration is undertaking the daily work of the National Energy Committee.

The **Climate Change Leading Group** serves as a high-level coordinating and consultative body on climate change issues. The State Council created the **Climate Change Leading Group** in 2007 (China, 2007). It is headed by the Premier, and its membership includes the heads of all major agencies and therefore overlaps to a great degree with that of the National Energy Committee, however the Leading Group's membership also includes heads of technical bureaus and commissions that have expertise in climate change. Closely connected to the Climate Change Leading Group is the National Committee of Climate Change Experts, comprised of experts drawn from academia. According to China's Second National Communications to the UNFCCC (November 2012), the Climate Change Leading Group is mandated to develop major strategies, guidelines and policies on climate change, to take actions in response to climate change, to review plans for international cooperation and negotiations, and to coordinate actions in addressing climate change. Notwithstanding the Climate Change Leading Group's formal mandate, we believe that its role in actuality is confined mainly to coordination and consultation, which meets rarely. The Group is hosted by the NDRC, which handles the "routine work" for the Group, and we believe exercises authority to appoint experts to the National Committee of Climate Change Experts. Provinces have been directed to establish provincial climate change leading groups comprised of government agencies to take action at the local level on climate change, and many cities and counties have also established such groups according to China's Second National Communications.

The National Climate Change Leading Group members are twenty ministries and departments, as well as state bureaus with technical expertise in climate change:

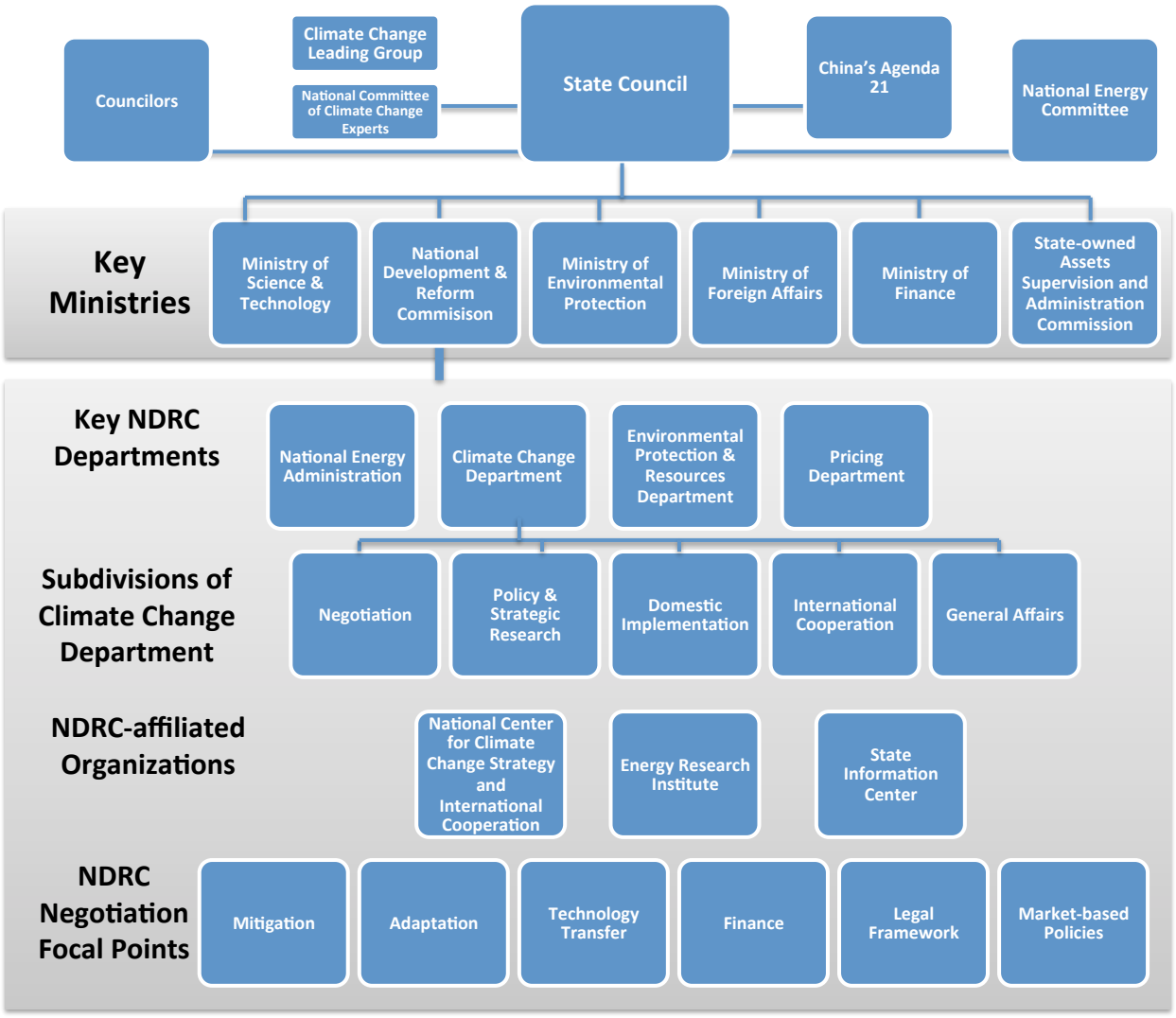
Ministry of Foreign Affairs
National Development and Reform Commission
Ministry of Science and Technology
Ministry of Industry and Information Technology
Ministry of Finance
Ministry of Land and Resources
Ministry of Environmental Protection
Ministry of Housing and Urban-Rural Development
Ministry of Transport
Ministry of Water Resources
Ministry of Agriculture
Ministry of Commerce
Ministry of Health
National Bureau of Statistics
State Forestry Administration
Chinese Academy of Sciences
China Meteorological Administration
National Energy Administration
China Civil Aviation Administration
State Oceanic Administration

**China's Agenda 21** is a government body tasked with supporting China's sustainable development goals. Its members include all ministries, key government agencies, trade groups and other state organizations with an obligation to progress sustainable development. Although formally created under the State Council, China's Agenda 21 is housed in, staffed by, and associated with, MOST. The organization actively promotes China's development of renewables, energy efficiency and other technologies both to mitigate China's emissions and to support China's export industry. It is developing South-South cooperation programs focusing on technology transfer. China's Agenda 21 plays a mainly support role as well as an external relations role, but has limited or no independent authority for policymaking.

We note that the NDRC's primary role does not mean it is an exclusive one. Although it sits at the center of most policy formation clusters, it must coordinate with other agencies. We explore NDRC's role relative to other agencies in Part 6 of this study where we consider policy formation in an issue-specific context.

In particular, the NDRC and Ministry of Foreign Affairs coordinate efforts because the negotiations are related to China's foreign relations. However the NDRC's role and capacity in national energy and climate policies places the NDRC in a dominant position in the UNFCCC negotiation process.

**Figure 3: State Council, NDRC and Affiliated Climate Policy Formation Organizations**




Source: Authors' analysis

We analyze the composition of China's delegations to UNFCCC meetings for COP 18 through COP 22 to confirm the importance of government agency organizations relative to each other in the climate negotiations. Our analysis only accounts for government officials listed as government delegates. Based on our analysis of the affiliations of China's official delegates, the NDRC (including the NDRC's National Center for Climate Change Strategy and International Cooperation (NCSC)) is clearly the dominant organization, accounting for 26.4 percent of all representations for these most recent five COPs. Due to UNFCCC limits on the number of delegates, Chinese officials sometimes also attend COPs as delegates nominated by NGOs and other UNFCCC-accredited organizations. However, because our analysis is based on official delegate lists we do not capture these individuals. For the five COPs surveyed, the table below shows the number of delegates and frequency of participation for the most frequently attending government agencies based on China's official delegates lists for COP 18 to COP 22.

**Table 1: Analysis of China's Delegations to Recent UNFCCC COPs by Organization**

| Meeting / Government Agency | COP 18 | COP 19 | COP 20 | COP 21 | COP 22 | Instances of Participation COP 18-22 | Frequency of Participation COP 18-22 |
|---|---|---|---|---|---|---|---|
| **Delegates** | **139** | **111** | **87** | **268** | **77** | **682** | |
| **NDRC** | 29 | 21 | 19 | 22 | 14 | 105 | 15.40% |
| **MFA** | 8 | 8 | 8 | 59 | 10 | 93 | 13.64% |
| **NCSC** | 14 | 23 | 13 | 14 | 11 | 75 | 11.00% |
| **Embassy Staff** | 3 | 2 | 4 | 48 | 1 | 58 | 8.50% |
| **Local Government** | 9 | 14 | 7 | 9 | 2 | 41 | 6.01% |
| **Tsinghua University** | 8 | 7 | 5 | 6 | 4 | 30 | 4.40% |
| **MOST** | 4 | 4 | 2 | 5 | 1 | 16 | 2.35% |
| **CAAS** | 3 | 2 | 3 | 3 | 4 | 15 | 2.20% |
| **SFA** | 4 | 3 | 3 | 3 | 2 | 15 | 2.20% |
| **CMA** | 3 | 3 | 2 | 3 | 2 | 13 | 1.91% |
| **MEP** | 4 | 2 | 2 | 4 | 1 | 13 | 1.91% |
| **ACCA21** | 4 | 2 | 2 | 2 | 2 | 12 | 1.76% |
| **MOF** | 3 | 1 | 2 | 2 | 2 | 10 | 1.47% |
| **CAE** | 1 | 2 | 2 | 2 | 1 | 8 | 1.17% |
| **CASS** | 1 | 1 | 1 | 1 | 1 | 5 | 0.73% |
| **MOA** | 1 | 1 | 1 | 1 | 1 | 5 | 0.73% |

Source: Authors' analysis of UNFCCC records

## 4. Expert Group Stakeholders

China's government supports an extensive system of universities and research institutes. These organizations are government institutions, however they operate in an environment of relative openness. Well-supported financially and relatively free to engage in research and open academic debate, they serve as both think tanks to the government, as well as an alternative means to engage with foreign audiences. The best funded with the greatest access to government are generally located in Beijing.

We focus on four types of expert organizations that provide policy support to the Chinese government. These are:

- Government ministry expert agencies and research institutes;
- Chinese Academy of Sciences and Chinese Academy of Social Sciences and their affiliated organizations;
- Universities, primarily focusing on leading institutions located in Beijing; and
- Individual participation in the National Committee of Climate Change Experts and international bodies such as the China Council for International Cooperation on Environment and Development.

### *Government Ministry Technical Agencies and Research Institutes*

Government ministries maintain research organizations that play important roles in supporting China's negotiations efforts as well as meeting its obligations to the UNFCCC.

The Development Research Center of the State Council (SCDRC) supports the State Council by providing research on a wide range of topics relevant to the development of legislation and policy. SCDRC is comprised of various departments and institutes, among which the Environment and Resource Policy Institute and the Research Department of Industrial Economy are especially important for climate change. The SCDRC is staffed by academics that often are affiliated with leading universities. Examples of research topics SCDRC studies include carbon markets and urbanization policy. Significantly, SCDRC is both highly active in producing policy documents on climate policy, and enjoys a relatively direct channel to the State Council.

The China Meteorological Administration is a technical agency with responsibility for air quality monitoring and climate prediction. It assists China in meeting certain national reporting obligations to the UNFCCC and serves as the national coordinator for China’s IPCC contribution. It also is one of the leading expert agencies contributing to the development of China's adaptation strategy and policies.

As described in Chapter 3 of this report, the NDRC maintains the National Center for Climate Change Strategy and International Cooperation, which provides support to China's negotiators through analysis of potential greenhouse gas reduction contributions scenarios in relation to China's economy. The NCSC is also responsible for providing expert supervision of low carbon city and ETS pilot programs. NDRC's Energy Research Institute provides support on technology and policy options for conventional and clean energy.

The Ministry of Finance's Institute of Fiscal Science provides support in climate negotiations on finance issues, and it also leads research on different possible carbon related taxation mechanisms.

The Ministry of Environmental Protection maintains the China Research Academy for Environmental Science (CRAES), which provides support on issues such as traditional pollution regulation and air quality. The Ministry of Environmental Protection also studies low-carbon policies and environmental finance issues. The Policy Research Center for Economy and Environment (PRCEE) provides policy research support to MEP on greenhouse gas control technologies, and also researches mechanisms for emissions trading.

### *National Bureau of Statistics*

China's National Bureau of Statistics is a vice-ministry level entity under the State Council. In its role of managing the collection, processing and publication of China's statistics for economic activity, energy use, greenhouse gas emissions and other pollution emissions, the National Bureau of Statistics plays a unique role among government expert organizations. It maintains an energy division to specifically prepare China's energy-related statistics. The need for consistency and credibility of statistical data makes its expertise increasingly relevant to China's efforts in the international climate negotiations and, by extension, China's messaging to the outside world. President Xi's statements in November 2015 calling for all countries' NDCs to be monitored and reviewed periodically as part of the post-2020 climate regime will further enhance the National Bureau of Statistics' importance in ensuring China's reporting of emissions is accurate and consistent.

Although the National Bureau of Statistics possesses special expertise in the processing of statistics, we do not believe that it conducts this function entirely independently. China's upward revision of over a decade's worth of coal consumption statistics in the latter half of 2015 revealed that the revision was done in consultation with the NDRC and academic institutions. Again, this suggests the primacy of the NDRC in all aspects of climate policy, and the importance of contributions by expert organizations to the climate policy formation process.

### *Chinese Academies*

We group the Chinese Academies together, however these organizations operate independently and in some cases are only nominally affiliated with each other. Individual Chinese Academy institutions may be associated with a particular ministry, while other entities organized under the State Council may serve a broader group of ministries or stakeholders. The diagram below lists those entities that we believe are most important in the climate change negotiations based on their participation in UNFCCC meetings, in advisory committees supporting negotiation efforts, and in projects studying specialized aspects of climate change and policy (such as REDD+ or adaptation). As suggested by the diagram below, the various entities within the Chinese Academies provide negotiators with support on such issues as engineering, low-carbon policies, agriculture, forestry, atmospheric sciences, and geosciences.

### *Universities*

General funding for facilities, research support, and the ability to attract top faculty and students are among the factors that determine a university's ability to provide sustained support to the government. Geographic access to government officials is also important to the ability of

universities to contribute to the policy-making process. For these reasons, we focus primarily on the leading universities located in Beijing.

Among the leading universities located in Beijing, Tsinghua University has been the primary resource for China's climate negotiation efforts, given its specialization in engineering and the sciences. Tsinghua University has long supported the NDRC in preparing China's greenhouse gas inventories for its national communications obligations to the UNFCCC. Tsinghua University has also supported China's implementation of the Clean Development Mechanism, and is now deeply involved in supporting the development of China's pilot and national carbon market policies.

Based on our analysis of the attendance at UNFCCC meetings as shown on Table 1 in Chapter 3, Tsinghua University alone accounts for 4.4 percent of China's delegations to the UNFCCC, more than any other organization of any kind except the NDRC and the Ministry of Foreign Affairs.

Peking University hosts the Center for Climate Studies, which undertakes studies to support China's government. Faculty from the School of Environment, School of Architecture and other departments participate in advising the government on low-carbon policies and other aspects of climate change.

Renmin University of China's School of Environment and Natural Resources supports the NDRC's National Center for Climate Change Strategy and International Cooperation with climate modeling capability.

While these universities are among the primary academic institutions supporting China's formation of climate policy, these are not the only expert organizations engaged on these topics. Top national universities outside Beijing such as Nanjing University, Wuhan University and Zhejiang University, as well specialized universities such as China University of Petroleum, Central University of Finance and Economics, and North China Electric Power University play roles in supporting the formation of government policy in their particular area of specialization or technology focus.

### *National Committee of Climate Change Experts*

China's national government formed the National Committee of Climate Change Experts to advise on climate change issues. The Committee is comprised of approximately 30 senior level academics and researchers drawn from various expert organizations.

The table below illustrates how China's government works together with expert organizations in meeting its obligations under the UNFCCC, in this case with respect to China's preparation of its 2005 National GHG Inventory.

**Table 2: Institutions Involved in Preparation of China's 2005 National GHG Inventory**

| Agency | Role |
|---|---|
| NDRC | Overall Responsibility |
| Energy Research Institute, NDRC | GHG inventory for energy activities, and buildup of GHG inventory database |
| Tsinghua University | GHG inventory for industrial processes |
| Chinese Academy of Agricultural Sciences, and Institute of Atmospheric Physics, CAS | GHG inventory for agricultural activities |
| Chinese Academy of Forestry | GHG inventory for forestry |
| Chinese Academy of Environmental Sciences | GHG inventory for waste treatments |

Source: China's Second National Communications

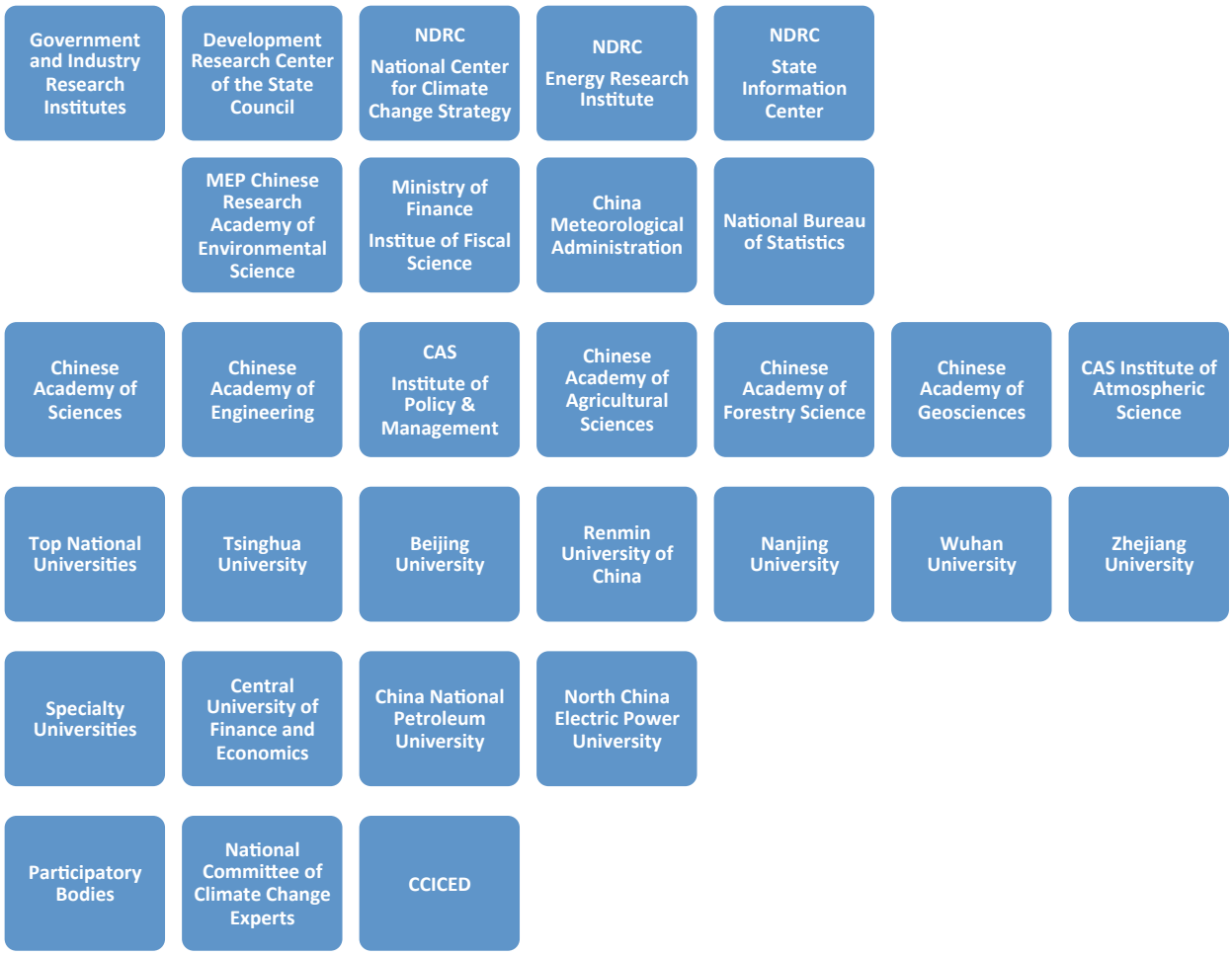
***International Expert Organizations***

Chinese experts from academia, government institutions and industry also participate in various international expert organizations, such as the Intergovernmental Panel on Climate Change, the Clean Development Mechanism Executive Board, and International Standards Organization technical groups that consider greenhouse gas accounting and low-carbon technologies. Governments such as the European Union regularly sponsor various programs facilitating knowledge and capacity building.

Expert organizations provide Chinese stakeholders with opportunities to learn from international practice and to develop collaborative relationships with colleagues in foreign countries in order to strengthen China's own capacity in specific fields. While we do not believe these international expert organizations play a direct role in policy formation, they provide significant information resources to Chinese experts and potentially influence individual expert's viewpoints.

In particular, we believe the China Council for International Cooperation on Environment and Development (CCICED), a high-level, advisory body, is especially significant in the context of China's climate policy formation process. China's State Council established CCICED in 1992 in order to further strengthen cooperation and exchange between China and the international community in the field of environment and development. CCICED is operated by a joint Chinese-foreign Secretariat and is funded by China and other countries. It composes experts drawn from China and foreign countries to prepare studies on various topics, including in the energy, pollution control, resources accounting and pricing, biodiversity, and science and technology fields. Its studies are intended for use by the Chinese government to shape policy. As CCICED is sanctioned by the State Council, focuses on China's own environmental and development challenges, and provides a forum for candid exchange of viewpoints, it is in a unique position to speak to the Chinese government, propose and shape policy. China's State Council requests CCICED to undertake projects on specific topics of importance to the government, and the CCICED is chaired by China's Vice Premier responsible for environmental matters, who is also typically a member of the Politburo Standing Committee.

**Figure 4: Representative Expert Organizations Engaged in Climate Policy Formation**



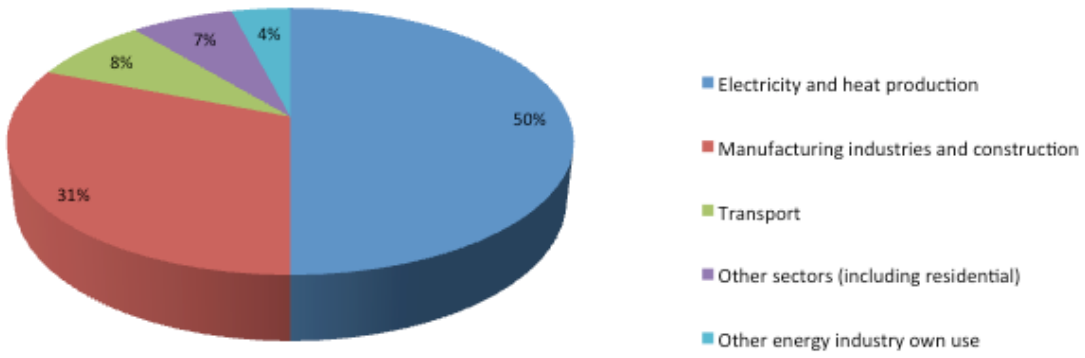

Source: Authors' analysis

## 5. Industry Stakeholders

We believe several important factors affect the way industry stakeholders contribute to climate policy formation in China. The overall importance of an industry or enterprise in terms of the monetary and technological value of their products, revenues, number of employees, and overall importance to China's economy and foreign trade are all factors we believe determine which industries are able to influence climate change policy. We also believe that the carbon-intensity of an industry's products, and thus the impact carbon regulation would have on profitability, and the capacity of enterprises to implement carbon management measures also enhance their motivation to engage with policymakers and their ability to exert influence. Industry relies on both economic power and specialized expertise to influence climate policy. Industry's efforts to shape climate policies can both progress these policies or resist them.

Based on these factors, research and interviews, we believe that the energy complex, iron and steel, chemicals, cement, transportation, infrastructure and certain other carbon-intensive manufacturing are most active in attempting to shape climate policy in China. These industries are among the most highly exposed to the risks associated with greenhouse gas reduction policies. Significantly, these sectors are covered by one or more of the seven regional pilot carbon markets and are candidates for inclusion in the national carbon market to start in 2017.

**Figure 5: China's $CO_2$ Emissions by Sector, 2011**




Source: International Energy Agency

Within these sectors, large state-owned enterprises are important economically and enjoy the closest ties to the Party and government. They are therefore likely to play the greatest role in shaping policy. Enterprises with headquarters in Beijing generally enjoy more regular access to decision makers and potentially greater ability to participate in policy formation, thereby enhancing their influence.

As suggested by our analysis of attendees at UNFCCC meetings, enterprises are generally not directly represented at the international negotiations. Chinese enterprises, unlike their western counterparts, confine their engagement on climate change issues to domestic political and government institutions. As described previously, the NDRC plays the major role in engaging domestic stakeholders and representing China internationally in the climate negotiations. At the

same time, the Ministry of Industry and Information Technology, Ministry of Commerce and the State-owned Assets Supervision and Administration Commission (SASAC) also solicit the views of industry for consideration in developing climate policy. Importantly, SASAC controls 33 percent of China's total industrial assets nationwide (Zweig, 2015).

Chinese enterprises typically do not yet identify a single individual responsible for sustainability, although companies are now creating carbon asset management divisions in response to China's policy to establish a national carbon market nationwide in 2017. Individuals with responsibility for engaging on climate policy may not be obvious, or the responsibility may be held at the board level. Officers and directors holding positions in the Party organization of a particular enterprise - such as the enterprise's Party secretary - might also play a role in policy discussions.

We believe that within enterprises the setting of company policy on climate change is likely retained at the board and executive officer levels. For example, a CEO, president or high-level officer who possesses authority to speak for company policy might be the person responsible for these issues. In Chinese enterprises, these individuals are typically experts in their industry due to their background and history with the company. However, relative to their western counterparts, they seldom speak publicly on issues.

Another group of influential individuals are managers of $CO_2$ reduction projects. These individuals may not possess authority to speak on company policy, however their role in high profile projects that are often supported with government funds make them more accessible. Due to the important roles they play in these projects and their responsibilities within their organizations, they also may participate with government officials in formation of policy as experts.

Here we set out several of the enterprises in China's energy complex that we believe are especially influential based on the above criteria.

China's five major power companies are the **Huaneng Group,** China’s largest power producer and the second largest power producer in the world, **Datang Group, Huadian Corporation, Guodian Corporation** and the **China Power Investment Corporation**. The **China Power Investment Corporation** is a wholly state-owned company that acts as the government’s arm for investment in the power industry and owns and operates power plants directly as well as holds shares in other generation, transmission and distribution companies.

**China National Petroleum Company** (CNPC), its subsidiary **PetroChina**, and **Sinopec** are China’s largest mainland petroleum exploration and production companies. **China National Offshore Oil Corporation** conducts foreign oil and gas operations.

**Shenhua Group** is the world’s largest coal company.

These companies are all critical to China's economy and their operations are highly energy intensive. They are already subject to various types of carbon reduction regulation, which will intensify as China establishes its national carbon market in 2017. The Chinese government has already forced the closure of inefficient power plants, and set emissions-based performance standards for new plants. The electricity sector's greenhouse gas emissions are certain to be regulated under China's national carbon market. Coal consumption is subject to a cap and is required to decline according to Chinese policies and its NDC by 2030, affecting both the coal

production and electricity generation sectors. Several types of environmental taxes are already collected in China affecting the transportation fuels sector - the most significant being elevated sales taxes for vehicles and petroleum fuel, followed by resources taxes (mainly on crude oil, natural gas and coal), pollution emissions fees, and annual vehicle and vessel taxes.

Importantly, these enterprises are responding to existing and anticipated future carbon regulation by seeking to develop low-carbon technologies, often with state financial support. Prominent examples include the GreenGen project to design, build and operate the country's first integrated combine cycle gasification (IGCC) power plant in Tianjin that integrates coal gasification hydrogen production, power generation and supplies $CO_2$ for use in enhanced oil recovery on a test basis. GreenGen is a joint venture, majority-owned and developed by the Huaneng Group, with investment from China's other large state-owned power producers (Datang Group, Huadian Corp, Guodian Corp and CPIC), China's top coal mining companies (Shenhua Group, China Coal Group), China's State Development and Investment Corporation (SDIC), and the U.S.- based Peabody Energy Corporation. The Shenhua Group has developed the Shenhua Ordos Coal Liquefaction project, the world's first commercial direct coal liquefaction plant that supplies $CO_2$ for use in enhanced oil recovery and stores it in the process. This project has received substantial state financial support. China's oil companies are similarly developing carbon capture and storage technologies (CCS) as a means to store $CO_2$ to comply with anticipated regulatory requirements, while using $CO_2$ in enhanced oil recovery operations.

These and other initiatives in controlling greenhouse gas emissions illustrate that China's large state-owned enterprises actively engage with the government in seeking potential technological solutions to climate change with state financial support. In turn, industry's technical contributions influence climate policy. The government relies on enterprise expertise to manage these projects and, by doing so, brings these enterprises more deeply into the climate change policy formation process. We believe these projects shape the views of government policy-makers as to what is technologically and economically feasible for Chinese industry to achieve, and thus informs actual targets, deadlines and requirements required by the government.

In addition to technology initiatives, enterprise can seek to influence climate change policy using their specialized expertise through the standards setting process. Under China's Standardization Law, four types of standards are recognized: national, local, sector (industry), and enterprise standards. Importantly, the Standardization Law provides that trade associations, scientific research institutions and academic organizations play a role in formulating standards. Trade associations comprised of industry participants thus can engage in setting standards governing their industrial sector. Industry sectors and enterprises anticipating carbon regulation are already exploring the standard setting process as a means to define their practices and comply with future regulation. We believe these efforts will also potentially inform climate policy formation, particularly at the detailed level of regulation and performance requirements.

The figure below sets out selected representative industries and enterprises that we believe are influential in China's climate change policy formation process.

**Figure 6: Representative Industries and Enterprises Important to Climate Policy**


Source: Authors' analysis

While Chinese state enterprises are unlikely to outright oppose central government climate policy, they may oppose particular aspects or details of policies that affect their profitability or competitiveness. Examples of this include ongoing debate over how China's emissions trading system will allocate permitted emissions. While most stakeholders, including industry, recognize the advantages of using performance-based benchmarks for allocation of allowances (see Hart and Ma (2014) for a discussion of performance benchmarks), many industries have objected to benchmarking in favour of a grandfathering approach based on historical emissions intensity with incremental annual improvements. Objections to performance benchmarks by Chinese industry include concerns over performance data quality (China Carbon Forum, 2016). However, incumbent industry is likely objecting to benchmarks because grandfathering their emissions tends to relax the rigor of regulation, is supported by data that they have greater knowledge of and control over, and potentially provides incumbent producers with competitive advantages in terms of market access vis-a-vis newer entrants that have more advanced technologies yet produce at smaller scale. Reflecting the ability of industry stakeholders to influence policy, China ultimately adopted a hybrid approach to allocations for its national emissions trading scheme in which the overall cap will be determined by totalling historical emissions of participant enterprises, taking into consideration expected future mitigation actions based on a benchmark method that in turn takes into consideration the development status of the particular industrial sector. Allowances would then be issued to emitters based on their sector's portion of the cap, the starting point for which is the sum of historical emissions.

Perhaps the most pervasive, and environmentally and economically significant example of enterprise resistance to environmental policies concerns subsidies. China's state industry enjoys various kinds of direct and indirect subsidies, supporting both heavily polluting and clean/renewable industries. Many of these subsidies reinforce inefficient, uncompetitive, polluting behavior. Because these subsidies are in some cases critical to these enterprises remaining profitable, state enterprises fiercely resist their elimination. Chapter 8 discusses China's subsidies regime in greater detail.

Where enterprises are concentrated in certain regions or owned by local governments, state enterprises may effectively recruit local government authorities in supporting their positions with the central government, often on grounds of adverse impacts on the local economy and employment. Examples of this include resistance by local coal mining companies to central government efforts to restructure or eliminate them, which are also described more fully in Chapter 8.

## 6. Issue-Specific Climate Policy Clusters

In this part, we analyze China's climate policy formation process on an issue-specific basis. Having introduced the main stakeholders in the Party, government, expert organizations and industry, we believe China's climate policies are determined based on specific issues within policy clusters.

As we have described in prior sections, we believe there is a lead agency around which other government agencies and stakeholders coalesce. The lead agency is expected to build consensus, however policy decisions are typically contested within these clusters. In almost all cases, the lead agency is the NDRC. However, NDRC's role is not exclusive, and it is essential to understand the role of the various stakeholders and how they engage with one another to form a complete picture of policy formation for each general policy area.

We first analyze the bases of power drawing in part on sociological paradigms. Next, we consider specific climate negotiation issues. These issues define each cluster. As part of this analysis we provide a graphical representation of the organizations we believe are the dominant agency and key stakeholders.

### Determinants of Influence in Chinese Climate Policy Formation

We believe that the following four factors explain which stakeholders will be influential within a climate policy formation cluster:

- Political power
- Administrative or regulatory authority for implementation
- Economic power
- Subject-matter expertise

Stakeholders may rely on one or more of these bases of influence.

Our conception of the determinants of influence in climate policy draws on sociological theories of the sources of power generally. These determinants of influence are validated in the case of China based on interviews, government documents, published research relating to Chinese government policy making generally, and our analysis of the relative frequency of attendance of different organizations represented on China's climate delegations to the UNFCCC meetings.

Based on our statistical analysis of participation in UNFCCC meetings and research of the structure and workings of the Chinese government, we see political power residing mainly in the NDRC, which it shares to some degree with the Ministry of Foreign Affairs generally, and the Ministry of Finance over matters having financial and fiscal implications. The NDRC's political power is based on its responsibility for implementing China's economic reforms, its status as a super-agency tasked with implementing policy on behalf of the State Council thereby placing it above other ministries, and its role as the coordinating agency of China's climate change negotiation and domestic climate action efforts. Importantly, NDRC also engages closely with the Politburo of the Communist Party through supporting task forces to develop Party guidance

on environmental policies under the aegis of the Central Leading Group for Comprehensively Deepening Reforms.

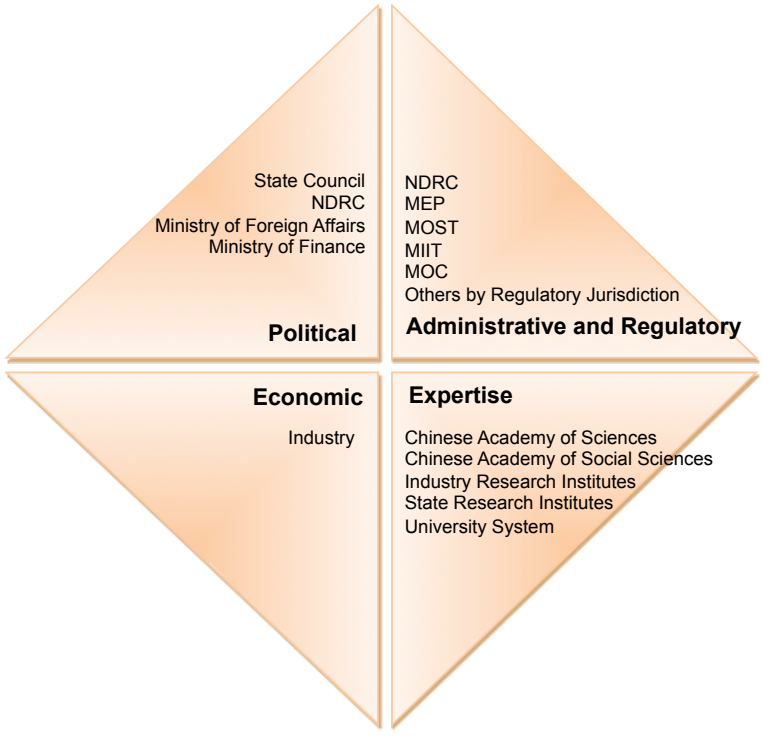
Administrative and regulatory power represents a base of authority related to political power but distinct in nature. Administrative and regulatory power is technical in nature and confined by grants of authority determined by political actors. The authority of the Ministry of Science and Technology and the Ministry of Environmental Protection, for example, are based mainly on administrative jurisdiction over technology development and environmental protection, respectively.

Economic power is primarily the domain of industry, however certain ministries such as the NDRC, MIIT, Ministry of Commerce, and SASAC engage with industry stakeholders and represent them in policy discussions.

Expert authority is dominated by the Chinese Academies and the university system. Government ministries such as NDRC, the Ministry of Science and Technology and the Ministry of Environmental Protection possess significant technical expertise in their areas of competence and host research institutes that support their respective regulatory missions. As we have previously discussed, industry and individual enterprises also possess specialized expertise upon which they also rely to seek to influence policy, particularly for proprietary or highly specialized industrial applications, knowledge of which is crucial for establishing detailed regulations or standards.

The diagram below represents the four bases of authority and selected associated stakeholders.

**Figure 7: Bases of Authority of Selected Stakeholders**




Source: Authors' analysis

## Climate Issues and Policy Stakeholder Clusters

Here we analyze issues that are core issues in the climate negotiations using the four traditional "Bali Building Blocks" as our example issues - mitigation, adaptation, technology transfer and finance.

For each of these issues, we evaluate the roles of key stakeholders using the four determinants of influence - political power, administrative/regulatory power, economic power and expert authority.

We depict stakeholder clusters in the figures below for each specific issue. In these diagrams, we further distinguish stakeholders that possess political power in the climate formation process based on their role as the lead coordinating agency in the process (typically formally designated as such), and secondary agencies that rely on administrative/regulatory authority over specific aspects of policy implementation.

### *Mitigation*

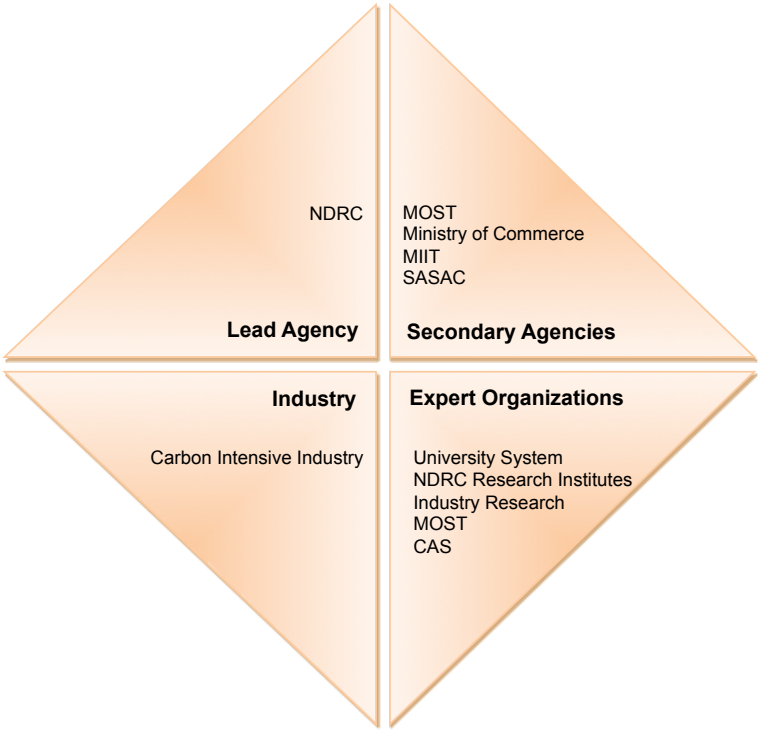
Mitigation of greenhouse gases significantly impacts the economy and therefore is of immediate concern to a broad range of stakeholders. The NDRC and industry are key stakeholders along with various other government agencies and expert organizations. Mitigation potentially concerns all industrial sectors, whether their emissions are directly controlled or not, because regulation of electricity and fuel commodities affects China's entire economy.

The NDRC is organizing carbon pilot programs nationwide and has emerged as the regulator for greenhouse gas emissions trading. As such, the NDRC is the dominant agency in the mitigation area. The Ministry of Finance plays an important role in administering resources and pollution taxes designed to curb pollution and greenhouse gas emissions. MIIT, Ministry of Commerce, and SASAC will also represent industry stakeholders in policy clusters, as they possess administrative and regulatory authority for affected enterprises.

The Chinese Academies, university system, specialized state research institutes and industry all possess expertise that inform and shape policy outcomes.

Since mitigation is typically technology-driven and often industry-specific in implementation, the specific stakeholders for policy formation may vary based on industry and technology. For example, power generation and fossil fuel consumption together account for the majority of China's greenhouse gas emissions, and mitigation discussions revolve around the technical feasibility and cost of adoption of specific technologies applicable to specific sectors in determining targets and policies. Thus, the policy cluster concerning greenhouse gas reductions for coal-fired power generation technologies, such as carbon capture and storage technologies, may differ slightly from those relating to renewable energy technologies.

**Figure 8: Policy Formation Cluster - Mitigation**




Source: Authors' analysis

### *Adaptation*

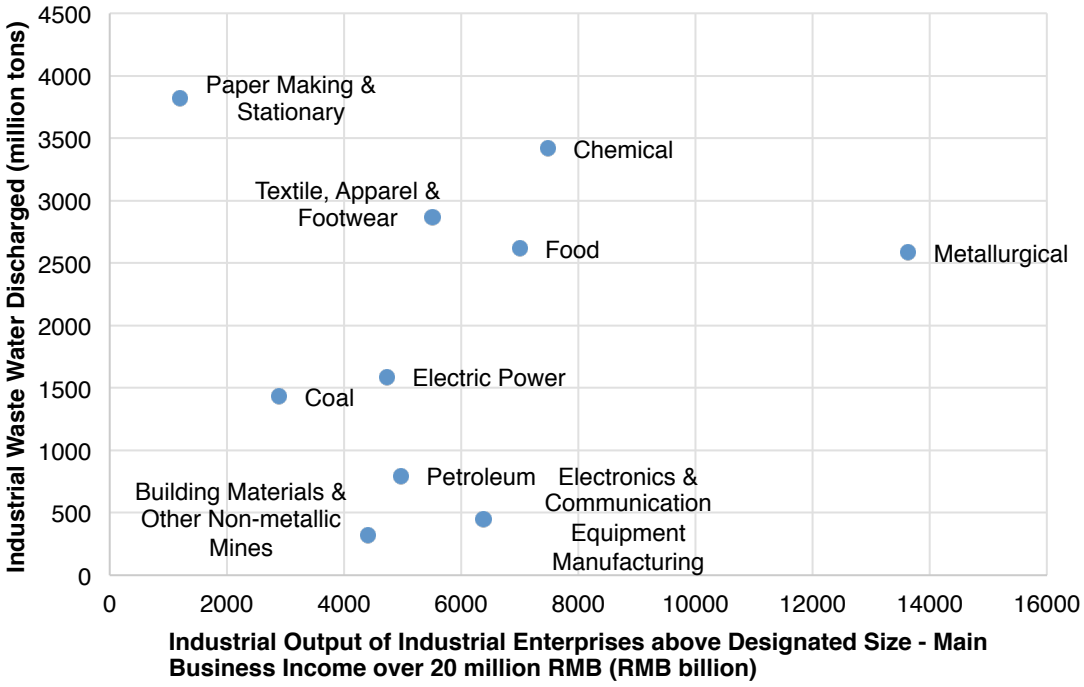
Climate adaptation is a unique cluster area because it is perhaps the least developed of China's climate policies. To some extent, this is because the risks posed by climate change differ dramatically across China given variations in temperature and weather conditions, precipitation patterns and water resources, forest resources and agricultural crops, disease vectors, and levels of development. Risks of drought, fire, flood, sea level rise and storm differ dramatically from North to South and from coastal to inland regions. Regions and local communities will be differently impacted by climate change and thus their adaptation measures must, to a certain degree, be distinctive to regional and local conditions. Climate impacts are only recently becoming more fully understood by stakeholders and monitoring and forecasting capabilities remain underdeveloped.

**Figure 9: China Climate Exposure Map**


Source: Authors' adaptation based on map provided by Rebecca Nadin

The water, forestry and agriculture sectors are probably most aware of the need to adapt to climate change, both due to potential adverse impacts and opportunities to participate in carbon emission reduction projects in their sector. The power sector, which depends on water for thermal and hydropower plants, and general manufacturing industries are only beginning to understand potential constraints on their operations posed by water availability. The stringency of China's regulation of water resources has increased significantly with the recent introduction of water efficiency measures and tighter water pollution discharge standards on an industry sector-specific basis. The figure below illustrates the industry sectors are most exposed to water risk based on their water pollution discharge volumes relative to value of industrial output.

**Figure 10: 2011 Top 10 Most Polluting Industrial Sectors**



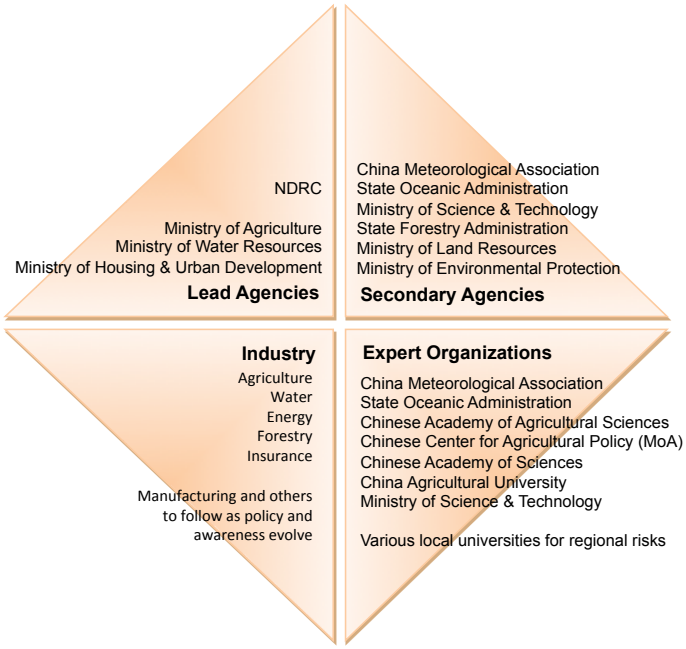

Source: Tan, 2014; Ministry of Environmental Protection and National Bureau of Statistics, 2012; National Bureau of Statistics, 2012.

The NDRC retains authority for adaptation in the international negotiations and coordinated the development of China's National Adaptation Strategy together with 12 other ministries. The National Adaptation Strategy, described further below, provides a framework for further development of urban adaptation plans and provincial adaption plans, which will also be coordinated by the NDRC and the DRCs (Nadin, Optiz-Stapleton and Jia, 2016). However, on sub-issues such as agriculture, water, forestry, and biodiversity, the Ministry of Agriculture, Ministry of Water Resources, State Forestry Administration, and the Ministry of Environmental Protection, lead policy formation efforts in each respective area. Based on interviews, rural and urban adaptation efforts are not integrated, but rather distinct work streams. For urban adaptation issues, the Ministry of Housing and Urban Development co-leads adaptation efforts together with the NDRC. A third work stream focuses on disaster risk management, a long-standing priority for China, which is led by the Ministry of Civil Affairs and the National Commission for Disaster Reduction, and includes participation of the State Flood Control and Drought Relief Headquarters, the National Forest Fire Prevention Headquarters, the National Disaster Relief Coordination Office, as well as the Ministry of Health.

These efforts are supported by leading expert organizations working on adaptation, including the China Meteorological Administration, which operates weather monitoring and data collection stations throughout China, the State Oceanic Administration, which provides data and analysis for marine environments and coastal regions, and the Ministry of Science and Technology, which supports research in adaptation risk identification and mitigation. Relative to mitigation, fewer academic institutions have focused on adaptation as an explicit subject. Adaptation research programs are established at the Chinese Academy of Agricultural Sciences, Chinese

Academy of Social Sciences, and research institutes associated with the various ministries engaged on adaptation issues, particularly in the fields of agriculture, hydrology, health, and disease control. Provincial universities and research institutes are studying adaptation issues within the context of traditional disciplines, as local governments seek their assistance to confront challenges posed by a changing climate to agriculture, resource use, and other areas. Locally developed knowledge and expertise dispersed across China's university system appears substantial yet remains fragmented.

**Figure 11: Policy Formation Cluster - Adaptation**

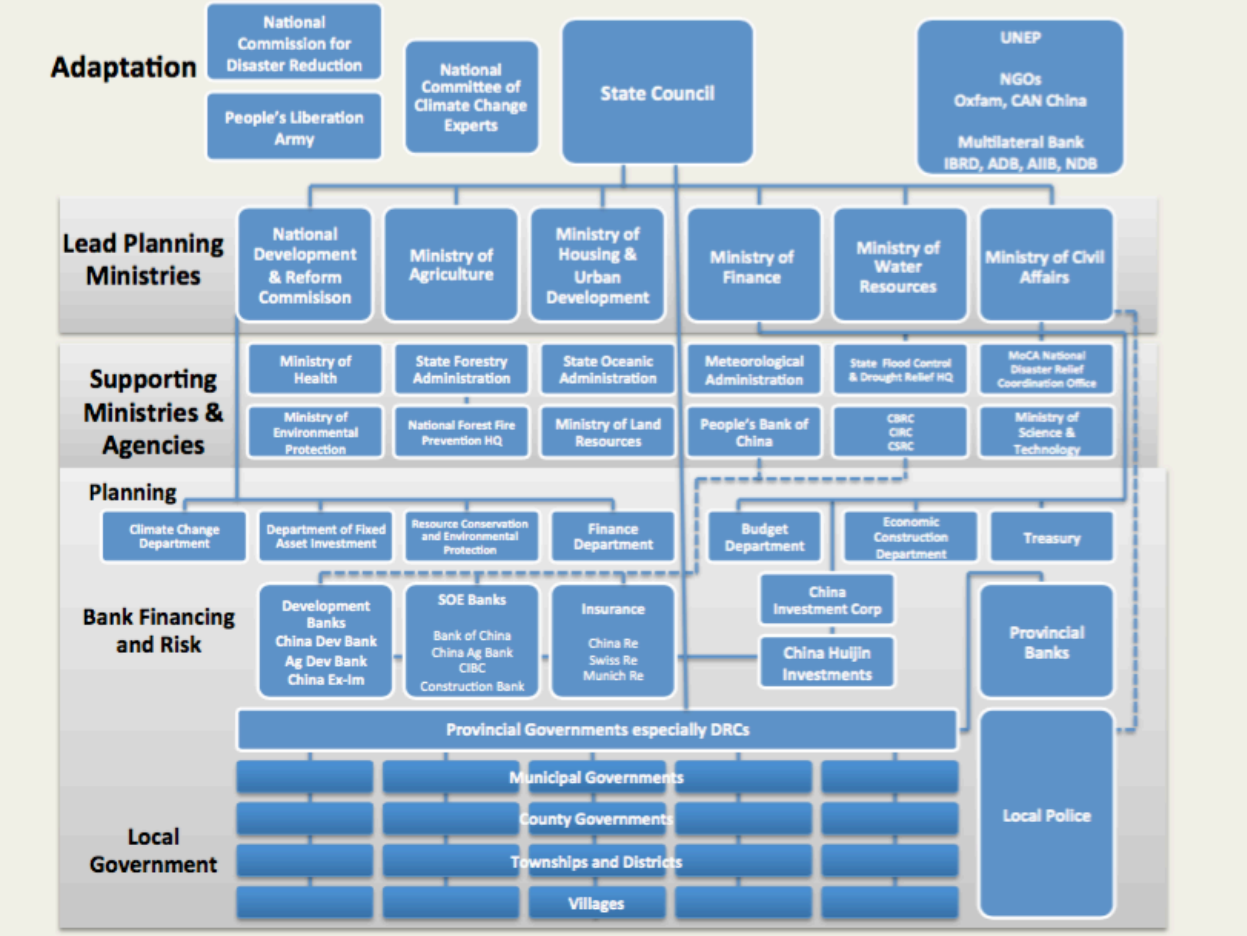



Source: Authors' analysis

As noted above, adaptation is felt most directly by communities and thus is a distinctly local issue. China's rural communities are especially vulnerable to climate change both because they depend on agriculture for survival, and in turn water resources and favorable weather, and are China's poorest and least economically developed regions. Several provinces have hosted pilot programs focusing on adaptation research and capacity building, including Chongqing (Three Gorges area), Guangdong, Guangxi, Hainan, Hebei, Heilongjiang, Inner Mongolia, Jiangxi, Jilin, Ningxia, Shanghai, Sichuan and Xinjiang. These efforts are typically led by provincial development and reform commissions, along with provincial-level agencies associated with the heads of local environmental protection bureaus, meteorological bureaus and financial bureaus, as well as participation by the various other ministries identified in this section (Nadin, Optiz-Stapleton and Jia, 2016: 311-313). Although not formally linked in their efforts, provincial agencies and research institutions cooperate informally through adaptation research programs. Foreign governments and NGOs have funded provincial adaptation research, such as the Sino-Norwegian Biodiversity and Climate Change Project concentrating on Sichuan, and the Adapting to Climate Change in China Project supported by the Swiss and British governments. In the area of disaster prevention, China has adopted pilot programs in community-based disaster risk management (CBDRM), which are predicated on community leadership and adoption of disaster risk reduction measures. By end of 2012, over 4,100 communities had

established community-based disaster relief and management organizations and mechanisms, whose activities include risk assessment and education. However, these programs do not necessarily take climate change into consideration in their assessments and planning, and their actual level of preparedness remains difficult to assess (Zhou et al., 2016, 82-86).

**Figure 12: China Adaptation Policy**




Source: Authors' Analysis

The diagram above represents the government and non-government stakeholders primarily at the national level that we believe have a direct interest in adaptation policy formation and planning. The diagram represents interests rather than degree of actual participation in the policy development process. As noted above, adaptation policy development is only at the beginning stages. Much of the activity in adaptation remains confined to research and capacity building. Further, many of the stakeholders who we think should be engaged remain largely inactive, and efforts remain uncoordinated. Nor has industry been fully consulted or integrated into adaptation planning at either the national or local levels.

One stakeholder that we believe is particularly important but presently largely inactive is China's insurance industry. Chinese insurance companies presently lack risk identification, data, and modeling capabilities to properly evaluate climate-related risks. Both Swiss Re and Munich Re operate in China and are supporting local stakeholders in developing capacity to evaluate

climate risks. For example, Swiss Re has launched a pilot project with Guangdong to evaluate climate risks with the goal of establishing an indexed catastrophe bond program to insure against typhoons and extreme cold weather. China's Green Finance Committee is promoting the concept of "green insurance" that, while not specifically adaptation oriented, is intended to protect against environmental risks, and thereby create incentives to adopt risk monitoring and mitigation measures.

Climate adaptation will present China's Ministry of Finance and the insurance industry with significant financial challenges. Although the Emergency Response Law of the People's Republic of China adopted in 2007 requires the insurance system to insure against natural disaster losses supported by state resources, this provision has not been implemented due to lack of available funds. Similarly, provincial governments also presently lack provision of funding for climate adaptation (Nadin, Optiz-Stapleton and Jia, 2016: 316-317, 321).

Of concern, the financial condition of China's insurance industry is uncertain and not transparent. China's insurance industry invests heavily in China's securities and property development markets, which also lack transparency and are subject to speculative forces. There is extensive cross-ownership among real estate development enterprises and insurance companies. Worse, this investment and cross-ownership has been fueled by debt financing provided by China's state owned banking system and other financing mechanisms. In response, the China Insurance Regulatory Commission introduced financial solvency tests for China's 100+ national and provincial state insurers and private insurers, the results of which are not publicly available. A sound insurance system is a threshold requirement for mobilizing the insurance industry to support climate adaptation efforts.

As described more fully in Chapter 9, adaptation will be at the center of China's South-South climate diplomacy efforts. China intends to focus on information systems and early warning systems for extreme weather events.

### *China's National Adaptation Strategy*

China's National Adaptation Strategy (issued 19 November, 2013) identifies guiding principles, priority areas and pilot provinces for adaption in response to climate change. The National Adaptation Strategy was developed through the cooperation of 12 ministries and government agencies coordinated by the NDRC and joined by the Ministry of Finance, China Metrological Administration, and Ministry of Agriculture among others. The NDRC and local development and reform authorities (DRCs) are responsible for coordinating its implementation.

The overall objectives of the National Adaptation Strategy are as follows:

- To increase adaptive capacity and reduce vulnerability of the main climate-sensitive sectors, areas and populations, emphasizing 'anticipatory' adaptation approaches supported by enhanced monitoring and early warning to mitigate all types of losses caused by climate change, and to maximize benefits and minimize risks.

- Synergy and collaboration including between the central government and local authorities.

- Broad engagement focusing on raising public awareness of adaptation to climate change and international cooperation at various levels and through South-South cooperation.

The National Adaptation Strategy categorizes regions of China based on differing impact of climate change on production and people's living across different geographies, and divides China into three types of adaptation regions:

- Urban (high population density) areas in Eastern, Central and Western areas
- Agricultural
- Ecological (e.g., northeast forest belts, the Qinghai-Tibet Plateau eco-zone).

The National Adaptation Strategy identifies the following priority sectors, and mandates specific tasks to be carried out within each such area:

- Infrastructure
- Agriculture
- Water resources
- Coastal zones and maritime waters
- Forests and ecological systems
- Tourism and other industries
- Human health

China's National Adaptation Strategy provides guidance to improve institutional arrangements supporting adaptation, including:

- Legal Framework for adaptation to climate change to be developed,
- Mainstreaming climate change adaptation into national economic and social development planning for governments at all levels. Climate change adaptation plans at all levels are also to be formulated.
- Co-ordination of adaptation efforts, particularly flood and drought management, disaster prevention and mitigation, development through poverty alleviation, science and technology education, health care, forest fire prevention, pest control and infrastructure development.
- Increasing fiscal and financial policy support for adaption, including through climate financial markets and risk sharing mechanisms such as insurance.
- Strengthening technical support and capacity building, including through establishment of research institutions related to adaptation to climate change; improved climate change monitoring, prediction estimates, impact and risk assessment and development of adaptation technologies; enhancement of early warning systems capacity; and industrial and regional research capacity building to create a basic database and the interdisciplinary, cross-industry, cross-regional collaborative network of adaptation technologies.

Extensive South-South cooperation shall be carried out in areas such as:

- Agricultural production
- Desertification control
- Integrated water resources management
- Monitoring and early warning of meteorological and marine disasters
- Pest monitoring, prevention and control
- Biodiversity conservation
- Coastal zone protection
- Disaster prevention and risk reduction

### *Climate Finance*

Under China's laws and administrative arrangements, the Ministry of Finance is primarily responsible for domestic budget allocations and regulates international financial support to the Chinese government agencies for projects to promote mitigation, adaptation, technology transfer or any other purpose. Other government agencies may participate in budgeting decisions depending on the specific policy or aspect of climate change. For example, the diagram above in this chapter for adaptation shows the several departments of the Ministry of Finance and the NDRC that coordinate among themselves and other government ministries in planning and budgeting for infrastructure and climate change. Depending on subject matter, such as "green finance" initiatives, a slightly different set of stakeholders may be involved, depicted in the figure in Chapter 8 for China's green finance policies.

The Ministry of Finance's Budget Department, Treasury Department and the Economic Construction Department (formulates investment policies, budget proposals and earmarks funds for capital intensive infrastructure) are involved in climate finance-related decisions. The NDRC also shares responsibility for coordinating investment policies and budget proposals, and thus budgeting in its role as the planning agency for the state, which also encompasses environmental protection and climate-related investment. The NDRC's Finance Department facilitates overall budgeting and the provision of subsidies, the Department of Resource Conservation and Environmental Protection engages in budgeting for environmental projects, and the Department of Fixed Asset Investment coordinates planning among ministries for infrastructure investment (Nadin, Optiz-Stapleton and Jia, 2016: 315-315). The Ministry of Finance will therefore play a role in climate finance negotiations alongside the NDRC to the extent they concern China's accepting outside financial support, such as from the World Bank or foreign governments, or extending financial support to other countries.

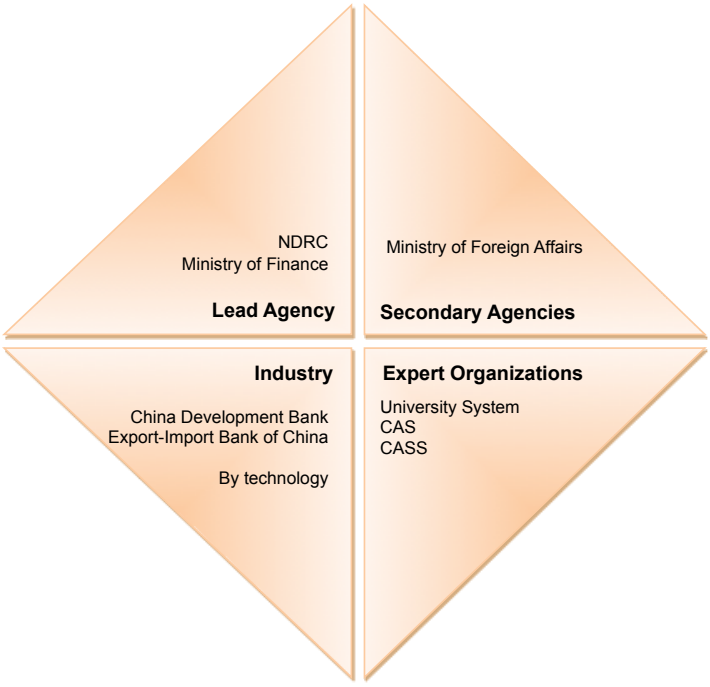
The fact that China itself expends substantial public funds on climate-related investment domestically suggests that the mechanisms for climate finance are already routinized within the Chinese government. According to estimates by the Climate Group (2013: 7), China's public investment in climate-related activities in 2012 amounted to $26 billion, which leveraged

additional investments from other sources. In 2015, the Ministry of Finance's budget included a specific line item for climate change (Nadin, Optiz-Stapleton and Jia, 2016: 316-317, 321).

China supports negotiation of climate finance issues on behalf of the G-77 plus China in an effort to strengthen its alliances within this group, even though it may decline to accept funds it has helped negotiate. These efforts are exercises in foreign diplomacy and thus the Ministry of Foreign Affairs plays an important role in these negotiations.

China's government is expanding bilateral South-South cooperation programs on climate change. These programs aim to provide finance, technology and capacity building support to least developed countries in Africa and South East Asia, as well as to China's broader G-77 relationships. The China Development Bank and the Export-Import Bank of China are expected to play a role in supporting China's provision of financial support to other developing countries in connection with climate change technologies and development. China's September 2015 announcement that it will devote $3.1 billion to assist other developing countries in addressing climate change will expand China's efforts in terms of volume of funding, target countries and ministries engaged in South-South efforts.

**Figure 13: Policy Formation Cluster - Finance**



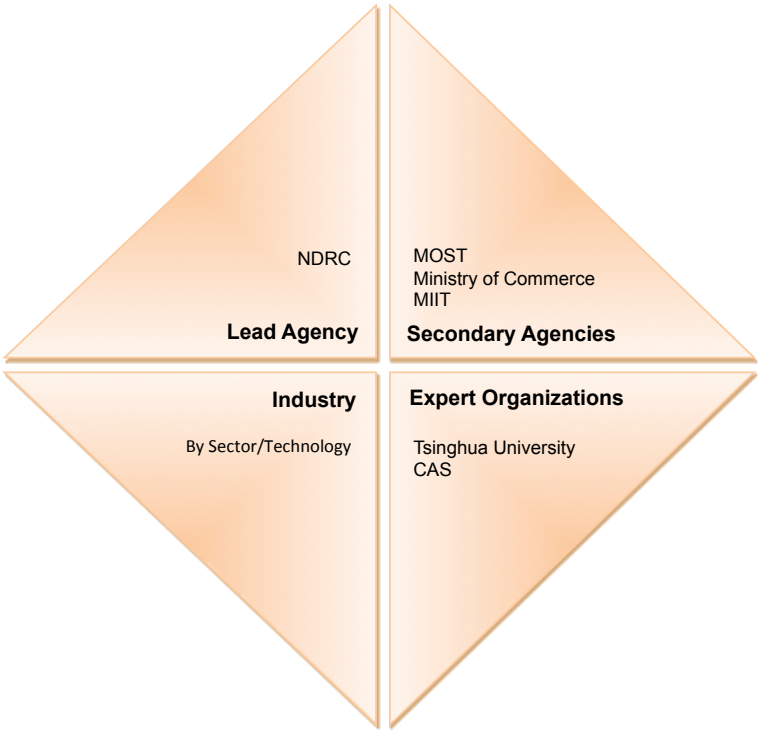

Source: Authors' analysis

### *Technology Transfer*

Technology transfer is an area of intense interest for China in the international negotiations due to its relationship to economic development and competitiveness. China is one of the most sophisticated countries in absorbing new technology and has been highly successful in commercializing and scaling-up deployment of renewables and other technologies for reducing greenhouse gas emissions. Responsibility for technology transfer is led by the NDRC and shared with MOST. For example, MOST and NDRC jointly issued the *National Scientific and Technological Actions on Climate Change During the 13th Five-Year Plan Period.* Significantly, MOST is primarily responsible for funding R&D programs for next-generation technologies and developing road maps for technology adoption for climate change and other fields. It is also developing a South-South cooperation center focused on climate change technology transfer. In addition to these ministries, the Ministry of Commerce contributes to technology transfer policy formation relating to intellectual property, and MIIT concentrates on emerging technologies.

Expert organizations, especially Tsinghua University and the Chinese Academies of Science, play a prominent role in technology transfer policy formation.

**Figure 14: Policy Formation Cluster - Technology Transfer**




Source: Authors' analysis

## 7. China's Positions at the UNFCCC and ICAO

In this chapter, we examine China's positions at the UNFCCC and the International Civil Aviation Organization. We start by considering China's Nationally Determined Contribution or NDC, how it was determined, and its relationship to China's five-year planning process. We then turn to each specific negotiation forum summarizing China's recent positions through review of its interventions and written submissions. China's international negotiation positions may inform us about China interprets its international contribution under the Paris Agreement, and how its contributions may evolve in the future under the Paris Agreement's stocktaking process.

### Overview of China's NDC

In its Nationally Determined Contribution, China announced its intention to take the following actions by 2030:

- To achieve peaking of $CO_2$ emissions around 2030 and make best efforts to peak early.
- To lower carbon dioxide emissions per unit of GDP by 60% to 65% from 2005 levels.
- To increase the share of non-fossil fuels in primary energy consumption to around 20%.
- To increase its forest stock volume by around 4.5 billion cubic meters from 2005 levels.

China also pledged to undertake the following actions:

- To improve fundamental research into climate change and strengthen R&D funding in order commercialize and demonstrate low carbon technologies.
- To promote the development of the national carbon emissions trading scheme.
- To enhance resilience to climate change.

China's NDC further outlined economy-wide and sector-specific policies and measures to achieve its intended contributions (China, 2015).

#### *Contributions not Commitments in Context*

Country NDCs have been carefully positioned as "contributions", rather than commitments. The concept of contributions reflects the economic and political sensitivities of certain developed countries such as the United States, Canada and Japan that cannot or will not commit their nations to binding commitments under international law, in the same manner as was contemplated under the Kyoto Protocol. The concept of contribution as opposed to commitment also mitigates the risk of failing to meet stated goals, and concerns that a legally binding "commitment" could lead to international sanction, whether legal or reputational. The notion of contributions was also compatible with the earlier positions of China and other developing countries that rejected the proposition that developing countries should undertake obligations under the post-2020 agreement, respecting the principle of common but differentiated responsibilities. The concept of "contribution" enabled developing countries to move past a simple rejection of any role to mitigate emissions, to a nuanced position that embraced a role, albeit an entirely voluntary one.

Implicit in the Paris Agreement's contributions approach is the positioning of developed and developing countries on an equal and voluntary basis, while preserving the principle of common but differentiated responsibility. For the United States in particular, political will to reduce emissions was conditioned on other major emitters including China taking action, reflecting concerns that effective collective measures required reductions by developing countries as well, in particular China and India, and that uneven efforts would be costly to those who acted, disadvantaging economic growth and trade. For developing countries, the placement of the United States, European Union and other OECD countries on an equal footing with developed countries within a common framework was clearly significant politically, particularly for China. The Paris Agreement represents formal recognition that China's climate efforts are as substantial as those of the United States and European Union, and that China has emerged as an equal partner in international environmental governance. Finally, the contribution concept also fit well with China's concerns about accepting any restriction on its sovereignty or intrusion into internal affairs, a concern shared by other developed and developing countries.

The Paris Agreement contributions and stocktake provisions established a framework for competition among countries to tackle the global climate change challenge. Without any enforcement or sanctions mechanism in the Paris Agreement, the rewards and penalties in this competition are purely reputational.

China's NDC is clearly understood by Chinese officials to represent a means to negotiate with other countries within an ongoing, competitive negotiation process. During the negotiation of the Paris Agreement, Chinese negotiators publicly advanced the proposition that the NDCs of all countries should be designed to hold global warming to a temperature rise within 2ºC of pre-industrial levels, a threshold reflected in the Paris Agreement Article 2 as the upper acceptable limit and long widely regarded as essential to avoid "dangerous climate change" as provided under UNFCCC Article 4(2). While no country's NDC pledges are presently adequate to meet that goal on a collective basis, it is expected that countries would negotiation under the Paris Agreement's global stocktake process (Paris Agreement, Article 14) to gradually increase individual and thus collective levels of ambition. China's own efforts reflected in its NDC provide a basis upon which it can demand appropriately ambitious efforts by others, and to resist pressure to pledge greater action without commensurate measures by others.

### *Process of Developing China's First NDC*

Notwithstanding the positioning of the NDC as a contribution, failure to achieve any stated pledge would still present reputational risks for China. Based on interviews with those close to the process, we understand the quantified targets outlined in the NDC were calibrated to be achievable with a high degree of confidence.

China's NDC was developed through a consultative approach that was designed to identify targets and activities to report to the UNFCCC. The process of developing the NDC followed a highly centralized and linear approach. The initial stage of the process was mainly technical in nature, relying predominantly if not exclusively on technical expertise within NDRC research groups. The process relied heavily on NDRC's highly specialized expertise in modeling within its Energy Research Institute and the NCSC. The NDRC also coordinated an external review process of possible NDC content. During the middle phase, a broader group of stakeholders were consulted comprising central government ministries and experts, such as those on the National Committee of Climate Change Experts. As far as we are aware, local government, industry stakeholders or civil society groups were not directly consulted, except to the extent

that they may have representation on expert committees or through relationships with the ministries that were consulted. In the final phase, the process became essentially political as the review process proceeded to the State Council and then to the Politburo Standing Committee.

Although China's process for developing its NDC was a strictly internal process, the NDRC and the United States' State Department held extensive bilateral discussions in order to better understand each other's positions before submitting their respective NDCs. These discussions were part of the two countries' broader engagement on climate change that produced the U.S.-China Climate Change Accord announced in Beijing in November 2014 by President Xi and President Obama. Although we do not believe China's NDC was coordinated with that of the United States, nor do we believe China would allow foreign relations with any particular country to drive its multilateral pledges or domestic climate policies, we do believe that China's broader engagement with the United States on climate change provided information that helped it calibrate its NDC to reflect a level of ambition commensurate with that of the United States and appropriate for a country assuming a leading role in international environmental governance.

### *China's NDC and the Five-Year Planning Cycle*

China's first NDC was developed towards the latter part of the period covered by the 12th Five-Year Plan, corresponding to the end of the process of developing the 13th Five-Year Plan. As a result, development of China's first NDC was not integrated with China's 13th Five-Year Plan development process. Nevertheless, the development of the NDC is expected to inform the five-year planning process, as explained below.

As China's NDC targets are regarded as achievable with a high degree of confidence, experts we interviewed do not expect the NDC to lead behavior on the ground. Significantly, we understand that planning for China's Energy Revolution contemplates significantly more aggressive targets and reductions beyond China's NDC.

Notwithstanding the conservative approach used in its development, China's NDC targets and actions meaningfully raised China's stated goals, and we understand that the process of developing the NDC contributed to informing the viewpoints of those involved in the five-year planning cycle for energy and climate issues within the NDRC.

In the immediate term, China's NDC targets can be used by the central government to guide local government efforts on climate change. As noted above, failure to achieve internationally announced NDC targets or actions carries reputational risk. In that sense, we believe China's NDC may come to represent a minimum requirement for government officials to achieve.

In the longer term, under the pledge and review process of the Paris Agreement, which commences in 2023 and then every five years thereafter (Paris Agreement, Article 14), we expect that any future iterations of China's NDC will be the subject of analysis and intense debate by both domestic and international audiences. China's NDC represents China's leadership efforts on climate change. Thus, China's NDC may emerge as a significant driver of domestic policy.

Towards that end, the 14th Five Year planning cycle and subsequent cycles can be expected to more fully consider the role of the NDC in domestic planning. Future iterations of the NDC may also potentially integrate with future 5-year planning processes.

## China's Positions at the UNFCCC Negotiations

As the largest emitter of greenhouse gases, China's negotiation positions in the international climate negotiations are of great importance to global efforts to address climate change. At COP 21 in Paris in 2015, China emerged as a more positive participant in the negotiations, in contrast to its positions at COP 15 in Copenhagen in 2009 that carefully avoided embracing international obligations (Li, 2016; Ye and Wu, 2015). For the first time China was willing to commit to an absolute cap on emissions subject to international measurement, reporting and verification (MRV), which will be facilitated by China's transition from energy-intensive growth to balanced economic consumption (Hilton and Kerr, 2017). However, as a developing country, China strongly insists on economic growth that will be challenging to achieve while reducing its emissions (See Gupta and Wong, 2014 for a discussion of this issue). Given the tension between embracing emissions limits and insisting on growth, China's negotiation positions are worthy of careful attention.

This chapter provides a comprehensive summary of China's positions on key issues in the climate negotiations relevant to the Paris Agreement, as well as negotiations at the International Civil Aviation Organization (ICAO) to reduce aviation emissions through global market-based measures (GMBM), an aviation emissions cap and trade program. In brief, we find that:

- China insists that "common but differentiated responsibilities" (CBDR; expressed as "common but differentiated responsibilities and respective capabilities" under the Paris Agreement (CBDR-RC)) must be preserved as a general principle, and taken into account in all key issues under the Paris Agreement and GMBM of ICAO;

- As an extension of CBDR, China stresses *flexibility* towards developing countries on important topics like adaptation, nationally determined contributions, accounting and transparency;

- China insists on country-determined approaches in general, and stresses *diversity* in considering the specific needs, concerns and circumstances of developing country Parties;

- China underscores that developed countries shall provide both financial and technical support to developing country Parties, and shall play a leading role in implementation of the Paris Agreement; and

- China emphasizes the lack of adequate financial support for developing countries in adaptation and mitigation efforts, and calls on urgent and enhanced support.

The table below provides a summary of China's positions on selected issues under the Paris Agreement, followed by detailed analysis of each topic.

## Table 3: Summary of China's Positions over Key Issues in the Paris Agreement

| *Part I: Specific Issues* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *Manner* | | | |
| | *CBDR* | *Flexibility* | *Diversity* | *Developed countries lead* | *Support for developing countries* | *Party-Driven* | *Other* | *Other key Points* | |
| **Transparency** | √ | √ | | | ○ Support provided on continuous basis<br>○ Form one cohesive whole<br>○ Coherence of work among developing countries essential | | ○ Facilitative, non-intrusive, non-punitive | ○ Transparency framework to be based on existing transparency | |
| **Capacity Building** | √ | | √ | | ○ International Consultation and Analysis (ICA), Capacity-building Initiative for Transparency (CBIT) should provide adequate support<br>○ Additional funding support by GEF | √ | ○ Balanced, equitable in geographical representation and gender | ○ Should be based on and responsive to national needs and fostering country ownership, and the process must be participatory, Party-driven and cross-cutting | |
| **Nationally Determined Contributions (NDCs)** | √ | √ | √ | √ | Not mentioned | √ | ○ Nationally determined is the most crucial feature of NDCs. | ○ Developed country Parties should have higher requirements for providing information about their NDC implementation<br>○ NDCs should include mitigation, adaptation and means of implementation | |
| **Accounting** | √ | √ | √ | √ | Not mentioned | √ | | ○ Developing country Parties should be allowed to choose, in a nationally determined manner, the sectors and gases covered in their NDCs and specific methodologies on accounting | |
| **Global Stocktake (GST)** | √ | | √ | | Not mentioned | √ | ○ Comprehensive, facilitative<br>○ Transparent, balanced and holistic | ○ GST should cover mitigation, adaptation and the means of implementation and support | |
| **Adaptation** | √ | √ | √ | | ○ Adaptation Fund crucial for adaptation actions yet current funding provided to developing countries still insufficient<br>○ Urgent and enhanced support needed<br>○ Look forward to enhanced access to finance and technical support on capacity | √ | | ○ Adaptation continues to be key priority for developing countries<br>○ Avoid creating additional burden for developing country Parties<br>○ Support recording adaptation communications in the public registry<br>○ Strengthen importance of loss and damage provisions in Warsaw International Mechanism for Loss and Damage (WIM) | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | ○ | WIM Executive Committee "five-year rolling work plan" basis for progressing WIM |
| | | | | | | ○ | Developed country Parties should provide resources to support WIM |
| **Mitigation and Article 6** | √ | | ○ | Scale-up financial resources, technology and capacity building for both adaptation and mitigation | ○ √ | Party-driven, coherent and balanced approach to Article 6 sub-items | ○ Balance between mitigation and adaptation<br>○ Paris Agreement Article 6 sub-items (Articles 6(2), 6(4), 8) equally important |
| **ICAO GMBM** | √ | √ | ○ Urges ICAO to develop climate change measures in a manner that is consistent with the principles of CBDR-RC<br>○ Proposals on Global Market Based Measures (GMBM) may impose inappropriate economic burden on developing countries<br>○ Some developed countries' intention to impose unilateral actions against global consensus hamper international collaboration<br>○ ICAO's GMBM scheme and its implementation must be fully aligned with and support implementation of the Paris Agreement<br>○ Reaffirm the unacceptability of the use of international civil aviation as a potential source for mobilization of revenue to finance climate change activities in other industrial sectors | | | | |
| ***Part II: General Principles, Technology and Financing Mechanisms, and Compliance*** | | | | | | | |
| **Equity / CBDR** | ○ Equity and common but differentiated responsibilities (CBDR) must be preserved as general principles and taken into account in all aspects | | | | | | |
| **Technology Framework** | ○ Emphasize the importance of technology development and transfer<br>○ Stress the importance and strategic role of Technology Framework<br>○ Strengthen periodic assessment of the Technology Mechanism to provide developing countries effective and adequate support<br>○ Strengthen effective linkage between Technology Mechanism with Financial Mechanism<br>○ Guidance to the Technology Mechanism should be flexible, considering needs of developing countries | | | | | | |
| **Financing** | ○ Access to adequate finance, and prioritize scaling up of finance, in particular adaptation finance<br>○ Emphasize additional, adequate and predictable finance source, and call for support from developed country Parties<br>○ Advocate that all developing countries are eligible to receive financial support for enhanced climate change actions<br>○ Opposition to use of per capita GDP as criteria for funding of developing country Parties<br>○ Accounting of financial resources must aim to provide transparency and consistency - reported information must be comparable and verifiable | | | | | | |
| **Compliance** | ○ Compliance Mechanism to be facilitative in nature and function in a manner that is *transparent, non-adversarial and non-punitive* as per Article 15 of Paris Agreement<br>○ Must take into account the respective national capabilities and circumstances of Parties | | | | | | |

Source: Authors' analysis of UNFCCC proceedings

In our discussion below, the following terminology is used:

| *Term* | *Full Name* | *Date* | *Location* |
|---|---|---|---|
| ***COP 15*** | Fifteenth session of the Conference of the Parties to the UNFCCC | 7-18 Dec 2009 | Copenhagen, Denmark |
| ***COP 21*** | Twenty-first session of the Conference of the Parties to the UNFCCC | 30 Nov – 11 Dec 2015 | Paris, France |
| ***COP 22*** | Twenty-second session of the Conference of the Parties to the UNFCCC | 7-18 Nov 2016 | Marrakech, Morocco |
| ***APA 1*** | First session of the Ad Hoc Working Group on the Paris Agreement (APA) | 16-26 May 2016 | Bonn, Germany |
| ***APA 1-2*** | Resumed session of APA | 7-14 November 2016 | Marrakech, Morocco |
| ***SBI 44*** | Forty-fourth session of the Subsidiary Body for Implementation (SBI) | 16 - 26 May 2016 | Bonn, Germany |
| ***SBI 45*** | Forty-fifth session of the SBI | 7 to 14 November 2016 | Marrakech, Morocco |
| ***SBSTA 44*** | 44th session of the Subsidiary Body for Scientific and Technological Advice (SBSTA) | 16 to 26 May 2016 | Bonn, Germany |
| ***SBSTA 45*** | 45th session of the SBSTA | 7 to 14 November 2016 | Marrakech, Morocco |
| ***CMP 12*** | 12$^{th}$ session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol | 7 - 18 November 2016 | Marrakech, Morocco |
| ***CMA 1*** | First session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement | 7 - 18 Nov 2016 | Marrakech, Morocco |
| ***HLM-GMBM*** | High-level meeting on a global market-based measure scheme under ICAO | 11 to 13 May 2016 | Montréal |
| ***Party*** | A Party to the UNFCCC, Kyoto Protocol or Paris Agreement, as the context requires | | |
| ***CBDR-RC*** | Common but differentiated responsibilities and respective capabilities | | |
| ***BUR*** | Biennial Update Report | | |
| ***ICA*** | International Consultation and Analysis | | |
| ***GCF*** | Green Climate Fund | | |
| ***(I)NDC*** | (Intended) Nationally Determined Contribution | | |

We track China's positions both as a country Party and as a member of the G77 and China negotiation group, as indicated in the text below. Where he G77 and China is referenced as the source a position, China or another country Party belonging to the G77 may have conducted the oral intervention or submitted the written intervention.

### *Transparency*

China's key positions on transparency in Article 13 of the Paris Agreement include:

1. *Differentiated obligations of country parties in transparency framework*

   China asks to recognize *differentiated obligations* of developed country Parties and developing country Parties in the Paris Agreement, and their *differentiated* information requirements, e.g. as outlined in Article 13.9 and Article 13.10 of the Paris Agreement. The modalities, procedures and guidelines of the transparency framework should reflect such differentiations accordingly (APA 1 opening plenary, China's submission of APA 1-2).

2. *Flexibility should be given to developing countries in a comprehensive manner*

   The G77 and China stress the relevance of flexibility for developing countries in the modalities, procedures and guidelines to be negotiated (APA 1 closing plenary).

   Similar statements made in China's submissions for APA 1-2, where China states that flexibility should be provided to developing countries in a comprehensive manner, including but not limited to reporting and review.

   The G77 and China Group highlights that flexibility applies to all aspects of the enhanced transparency framework – reporting, review, and multilateral consideration – for developing countries in light of their capacities (APA 1-2 opening plenary).

3. *Support to developing countries for transparency-related capacity building*

   At the APA 1 opening and closing plenary, the G77 and China stated that support shall be provided to developing countries for the implementation of Article 13 and for the building of transparency-related capacity on a continuous basis. China reiterates this point in its submission to APA 1-2.

   At the same time, support and action should form one cohesive whole. The G77 and China state the inter-linkage of transparency frameworks with other provisions of the Paris Agreement relating both to support and actions, and coherence of work among them is necessary (APA1 closing plenary; APA 1-2 closing plenary).

   At the COP 22 joint plenary, the G77 and China expressed that more focus should be given to transparency of support, as it is an immediate issue relating to transparency of actions. Similar statements were made at APA 1-2.

4. *Transparency framework shall be based on existing transparency arrangements*

   At APA 1 opening plenary, the G77 and China reiterated that modalities, procedures and guidelines under Article 13 should be based on and draw from experiences from existing arrangements related to transparency under the Convention and ensure balanced treatment of all areas indicated thereunder.

   China restated that the transparency framework shall build upon existing transparency arrangements under the Convention, including national communications, biennial reports and biennial update reports, international assessment and review and international consultation and analysis (China's submission to APA 1-2).

5. *Transparency framework to be facilitative, non-intrusive, and non-punitive*

   China emphasizes in its submission to APA 1-2 that the transparency framework should be implemented in *a facilitative, non-intrusive, non-punitive* manner, respectful of national sovereignty and avoid placing undue burden on Parties.

### *Capacity Building*

China's key positions on capacity building in Article 11 of the Paris Agreement include:

1. *Specific needs, concerns and circumstances of Developing Country Parties should be considered in capacity building*

   The G77 and China stated in the SBI 44 opening plenary that they would like to see the composition of the Paris Committee on Capacity Building (PCCB) to be completed in such a way that it is *balanced, equitable* in terms of *geographical representation and gender*, including a wide range of Parties to reflect the diversity of capacity building providers and recipients, and take into account the specific needs, concerns and circumstances of developing country Parties.

   China emphasized similar positions in its submission to APA 1-2, in which it stated the Capacity-building Initiative for Transparency (CBIT) should follow a country-driven approach, in line with national circumstances and specific needs of developing countries.

   The G77 and China at COP 22 stated that capacity building should be based on and responsive to *national needs* and fostering *country ownership*, and the process must be *participatory, Party-driven and cross-cutting*.

2. *International Consultation and Analysis (ICA) should be facilitative and lead to identification of capacity building needs of developing countries*

   At both SBI 44 Resumed 3rd meeting and SBI 45, the G77 and China reiterated that the ICA should be facilitative and lead to identifying capacity building needs of developing

countries to support reporting of information in subsequent Biennial Update Reports (BURs).[3]

3. *Capacity-building Initiative for Transparency (CBIT) to support developing countries*

   In its submission to APA 1-2, China stated CBIT should provide support to developing countries, including:

   - Training and facilitating dialogues between international and domestic experts from developing countries;
   - Supporting developing countries to implement transparency provisions, which will help developing countries identify their capacity-building needs;
   - Encouraging Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE) to provide its expertise on MRV to developing countries, and the CGE could assist the CBIT to design capacity-building initiatives;
   - Developed countries providing additional financial resources to the GEF to support the operation of the CBIT.

***Nationally Determined Contributions (NDCs)***

China's positions on NDCs in Article 4 of the Paris Agreement include:

1. *Implementation of NDCs should reflect the principle of CBDR-RC; flexibility should be provided to developing countries*

   The G77 and China stated at the APA 1-2 opening plenary that implementation of NDCs should reflect the principle of common but differentiated responsibilities and respective capabilities, in light of different national circumstances. China made the same statements in its submission to APA 1-2.

   The G77 and China stressed that the guidance for NDCs should be developed in a flexible manner to accommodate the diversity of NDCs and the national circumstances of developing country Parties (APA 1-2 opening plenary).

[3] BURs are reports to be submitted by non-Annex I Parties containing updates of national Greenhouse Gas (GHG) inventories, including a national inventory report and information on mitigation actions, needs and support received. Such reports provide updates on actions undertaken by a Party to implement the Convention, including the status of its GHG emissions and removals by sinks, and actions to reduce emissions or enhance sinks.

2. *Higher requirements should be applied to developed country Parties in providing information on their NDCs implementation*

   In its submission to APA 1-2, China advocated more strict information disclosure requirements for developed country Parties. Developed country Parties shall:

   - Provide all information related to their contributions on emission reduction listed in paragraph 14[4] of decision 1/CP.20 and paragraph 27[5] of decision 1/CP.21; and
   - Provide quantitative and qualitative information of their NDCs on providing and mobilizing finance, technology development and transfer and capacity-building support to developing country Parties, including in particular relevant targets, roadmaps and policies. Also, information on provision of support should be identified.

   While for developing countries, China stated that

   - Paragraph 14 is for reference. Specific information on developing country Parties' NDCs should take into account their diversified climate actions, different national circumstances and capacities and support received; and
   - Developing countries are encouraged to provide information on the costs of their mitigation actions, needs for adaptation actions, barriers in implementing their NDCs and needs for finance, technology and capacity-building support.

3. *Scope of NDCs should include mitigation, adaptation and means of implementation*

   In China's submission to APA 1-2, it states that the scope of NDCs has been defined in Article 3 of the Paris Agreement, which should include mitigation, adaptation and means of implementation. The NDCs *should not* be mitigation only or mitigation-centric.

[4] Paragraph 14 of Decision 1/CP.20: Agrees that the information to be provided by Parties communicating their intended nationally determined contributions, in order to facilitate clarity, transparency and understanding, may include, as appropriate, inter alia, quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals, and how the Party considers that its *intended* nationally determined contribution is fair and ambitious, in light of its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2

[5] Paragraph 27 of 1/CP.21: Agrees that the information to be provided by Parties communicating their nationally determined contributions, in order to facilitate clarity, transparency and understanding, may include, as appropriate, inter alia, quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals, and how the Party considers that its nationally determined contribution is fair and ambitious, in the light of its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2

### *Accounting*

China's positions on accounting principles in Articles 4 and 13 of the Paris Agreement include:

1. *Guidance for accounting should not be common accounting rules, but should be consistent with the nationally determined nature of Parties' contributions*

   China advocates that guidance for accounting should take into consideration the different content of NDCs by developed and developing country Parties and accommodate various types of NDCs.

   The purpose of elaborating guidance for accounting is not to impose detailed common accounting rules or transform Parties' NDCs into a unified form of absolute quantified emissions reductions, but is to develop general and technical guidance for Parties' reference when they are preparing, communicating and implementing their NDCs, with a view to facilitating transparency and understanding (China's submission to APA 1-2).

2. *Developed country Parties should lead in applying the guidance for accounting*

   China states that developed country Parties should take the lead in applying the guidance for accounting, in particular avoiding double counting in reducing emissions and providing finance.

   In accounting for their mitigation component of NDCs, the key issue is to determine the relation between the emission reduction target and their domestic emissions, carbon sinks and international transferred mitigation outcomes (China's submission to APA 1-2).

3. *Flexibility should be provided to developing country Parties in applying guidance*

   Developing country Parties should be allowed to choose, in a *nationally determined* manner, the sectors and gases covered in their NDCs and specific methodologies on accounting, in line with the content of their NDCs and in light of their national circumstances and capacities (China's submission to APA 1-2).

### *Global Stocktake*

China's positions on the Global Stocktake (GST) in Article 14 of the Paris Agreement include:

1. *Comprehensive and facilitative, Party-driven, transparent, balanced, holistic*

   The G77 and China advocate that the Global Stocktake shall *be comprehensive and facilitative*, covering *mitigation, adaptation* and the means of *implementation and support*, in the light of *equity* and the *best available science* (APA 1 opening plenary; SBSTA-IPCC special event on May 18, 2016 at SBI 44; APA 1 closing plenary; APA 1-2 opening plenary; China's submission to APA 1-2).

China elaborates that the GST is to be undertaken in a *facilitative manner*, *consistent with the nationally determined nature of Parties' contributions.* GST should be conducted in a Party-driven, transparent, balanced and holistic manner (China's submission to APA 1-2).

2. *GST should be conducted in accordance with CBDR*

   GST should be conducted in accordance with the principles and provisions of the Convention and relevant provisions of the Paris Agreement, in particular the principles of equity and common but differentiated responsibilities. GST should also be conducted in the context of climate justice, sustainable development and best available science.

   Modalities and procedures of the GST should consider the different roles and *differentiated responsibilities* between developed and developing country Parties (China's submission to APA 1-2).

### *Adaptation*

China's positions on adaptation in Article 7 of the Paris Agreement include:

1. *Adaptation continues to be the key priority for developing countries*

   The G77 and China emphasize the importance of adaptation, especially since developing countries are particularly vulnerable to adverse impacts of climate change (SBSTA 44; APA 1; CMP 12 and CMA 1).

   Adaptation should be placed on an equal footing with mitigation (APA 1-2 opening plenary).[6]

   Adaptation planning plays an important role in reducing climate vulnerabilities of local communities (SBI 45).

2. *Adaptation guidance shall reflect the county-driven nature of adaptation, aim to avoid creating addition burden for developing country Parties, and provide flexibility*

   The G77 and China advocate that further guidance in relation to adaptation communication should reflect the county-driven nature of adaptation. At the same time, the guidance shall enhance the adaptive capacity of developing country Parties *without* creating additional burdens and contribute to the global goal of adaptation (APA 1 closing plenary; APA 1-2 opening plenary; APA 1-2 closing plenary).

[6] Article 7 of the Paris Agreement "establishes *the global goal on adaptation* of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2 [of the Paris Agreement]."

The G77 and China stress the importance of implementing guidance providing flexibility as reflected in the Paris Agreement. Parties need flexibility in order to accommodate their different capacities and circumstances, as well as avoiding generating additional burden for developing countries (APA 1-2 closing plenary).

3. *Adaptation Fund is crucial for adaptation actions, yet current funding provided to developing countries is insufficient*

   The G77 and China emphasize that the Adaptation Fund plays a key role in contributing to the implementation of adaptation actions for developing countries, especially preparation of National Adaptation Plans (NAPs), providing direct access to funding for developing countries, and financing concrete adaptation actions by developing countries (SBSTA 44, COP 22).

   However, funding remains inadequate, particularly due to the slow progress of the operationalization of the Green Climate Fund (GCF) to secure support for the formulation and implementation of NAPs (SBI 44 opening plenary). The current financial resources available for the Adaptation Committee (AC) and Least Developed Countries Experts Group (LEG) is also inadequate for supporting the implementation of activities called for by NAPs (SBSTA 45 opening plenary; COP 22 plenary). Adaptation finance provided to developing countries remains insufficient (joint plenary of COP 22 and CMP 12).

   Thus, the G77 and China emphasize the need to scale up adaptation finance, particularly in the context of increasing climate risks faced by developing countries, and ensuring the balance between financing for mitigation and adaptation (COP 22 joint plenary).

4. *Developing countries require urgent and enhanced support as they formulate and implement National Adaptation Plans*

   The G77 and China reiterate that developing countries require urgent and enhanced support as they formulate and implement NAPs. The provision of necessary means of implementation to developing countries is crucial to their climate actions in both mitigation and adaptation (SBSTA 45; APA 1 closing plenary; COP 22 joint plenary). Required support includes enhanced access to finance and technical support for the formulation and implementation of NAPs (SBI 45 closing plenary).

5. *Ensure party-driven adaptation process and balance with mitigation actions*

   The G77 and China reiterate that the balance between adaptation and mitigation should continue to be pursued in the implementation of the Paris Agreement (APA 1-2 opening plenary). A balance between financing for mitigation and adaptation should also be ensured (COP 22 joint plenary).

6. *Record adaptation communications in the public registry*

   The G77 and China recommend recording adaptation communications in the public registry maintained by the UNFCCC Secretariat to record Nationally Determined Contributions communicated by Parties (SBI 44).

7. *Strengthening loss and damage provision critical to developing country Parties*

   The G77 and China expressed in APA 1 Opening Plenary that the issues of *adaptation and loss and damage* are critically important to developing country Parties.

   China calls for the Warsaw International Mechanism on Loss and Damage to be strengthened in its NDC submitted to UNFCCC in 2015.

8. *The "five-year rolling work plan" as a basis for progressing the Warsaw International Mechanism for Loss and Damage, with focus on needs and challenges faced by developing countries*

   The G77 and China noted that they are pleased that the indicative framework for the five-year rolling work plan of the Executive Committee of the Warsaw International Mechanism for Loss and Damage (WIM) achieved some clarity at the Marrakech Conference (joint plenary of COP 22 and CMP 12; CMA 1; COP 22 Closing Plenary).

   The G77 and China consider the five-year rolling work plan as the basis for developing corresponding activities. In order for this mechanism to be meaningful, it must address the needs and challenges faced by developing countries affected by extreme and slow-onset of climate change (COP 22 Joint Plenary).

   The G77 and China urge developed country Parties to provide resources to support activities under the five-year rolling work plan (joint plenary of COP 22 and CMP 12).

### *Mitigation and Article 6*

China's positions on mitigation in Article 6 of the Paris Agreement include:

1. *Emphasis on Adaptation*

   The G77 and China state that, while they all recognize the urgency of mitigation with the leadership by developed countries, adaptation must be emphasized, especially since developing countries are particularly vulnerable to adverse impacts of climate change (APA 1 closing plenary).

2. *Ensure balance between mitigation and adaptation*

   The G77 and China reiterate that the balance between adaptation and mitigation should continue to be pursued in the implementation of the Paris Agreement (APA 1-2 opening plenary). A balance between financing for mitigation and adaptation should also be ensured (COP 22 joint plenary).

   China advocates that all elements including mitigation, adaptation, and the means of implementation and support shall be accessed in a holistic way to ensure the linkage between action and support (China's submission to APA 1-2).

   The G77 and China reiterate the need to ensure a party-driven process in adaptation as well as to balance mitigation activities described in the three sub-items of Article 6, namely the guidance on cooperative approaches; the rules, modalities and procedures for the mechanism to contribute to mitigation and support sustainable development established by Article 6, paragraph 4 of the Paris Agreement; and the work programme under the framework for non-market approaches (SBSTA 44 closing plenary; SBSTA 45 opening plenary; SBSTA 45 closing plenary).

3. *Scale up finance, technology and capacity building for adaptation and mitigation*

   The G77 and China express that effective mitigation and adaptation actions will depend on access to technology, including the development of endogenous technologies by developing countries (COP 22 joint plenary). Enhanced action requires enhanced support in the provision of scaled-up financial resources, technology and capacity building. Action must cover both adaptation and mitigation (COP 22 Closing plenary).

4. *Party-driven, coherence and balance among the three sub-items in Article 6*

   At SBI 44 Opening Plenary, G77 and China stated that they look forward to enhanced actions through strengthening *institutional arrangements* and the establishment of a cooperative mechanism to address the negative economic and social consequences of response measures on developing countries.

   The G77 and China expressed matters relating to Article 6 of the Paris Agreement encompasses three components which are of *equal* importance: the guidance on cooperative approaches; the rules, modalities and procedures for the mechanism established by Article 6, paragraph 4 of the Paris Agreement, and the work programme under the framework for non-market approaches. Work on these must proceed in *a coherent and balanced* manner, without neglecting any component.

   Similar statements were made in the SBI 44 Closing plenary by the G77 and China reiterating the need to ensure a *party-driven* process as well as *balance* among all three sub-items.

## General Principles, Technology and Financial Support, and Compliance

### *Equity and CBDR-RC*

China's positions on Equity and CBDR-RC in Article 2(2) of the Paris Agreement include:

*Equity and CBDR-RC to be preserved as general principles and taken into account*

The G77 and China emphasize that the Paris Agreement represents an important step in efforts on climate change, through enhancing the implementation of the Convention, including its provisions and principles, *in particular equity and common but differentiated responsibilities and respective capabilities*, and that the delicate balance of all issues achieved in Paris as well as the principles and provisions of the Convention must be preserved (SBSTA 45 opening plenary).

Equity and common but differentiated responsibilities and respective capabilities must be taken into account especially in relation to enhancing the implementation of the Convention, its provisions and principles (COP 22 joint plenary).

### *Technology Framework*

China's positions on the Technology Framework in Article 10 of the Paris Agreement include:

1. *Importance of technology development and transfer*

   The G77 and China state that technology development and transfer is a *key* component for developing countries to be able to effectively address climate change (joint plenary of COP 22 and CMP 12).

   Effective mitigation and adaptation actions will depend on access to technology, including the development of indigenous technologies by developing countries (COP 22).

2. *Importance and strategic role of the Technology Framework*

   China emphasizes the importance of the Technology Framework established under Article 10 of the Paris Agreement to provide overarching guidance to the work of the Technology Mechanism under the Convention.

   For example, in SBSTA 44 opening plenary, the G77 and China advocate that the Technology Framework can provide *much needed guidance* to the work of the Technology Mechanism in promoting and facilitating actions on technology development and transfer in order to support the implementation of the Convention and the Paris Agreement.

The G77 and China expect the Technology Framework to facilitate the four working areas identified in decision 1/CP.21, Para. 67[7], as well as other areas, including *establishing linkage with the Financial Mechanism* and *supporting the implementation of NDCs*.

The Technology Framework should play a *strategic* role in the implementation of the Paris Agreement (SBSTA 45 opening plenary).

The G77 and China reiterate that the Technology Mechanism has an important role to play in order to support the *rapid transfer* of technologies to developing countries, helping them innovate and develop their own technologies (COP 22).

3. *Periodic assessment of the Technology Mechanism to strengthen provision of effective and adequate support*

   The G77 and China expressed in the SBI 44 opening plenary that *periodic assessment* of the Technology Mechanism to support the implementation of the Convention and the Paris Agreement should focus on providing developing countries with access to *effective and adequate support* for the development and dissemination of environmentally and socially sound technologies, and facilitate the Technology Mechanism to better serve the implementation of the Convention and the Paris Agreement.

4. *Strengthen linkage between Technology Mechanism and Financial Mechanism*

   At the COP 22 joint plenary, the G77 and China urged concrete enhanced actions on technology development and transfer, and acceleration and scaling up by the Technology Mechanism, under the guidance of the COP through the subsidiary bodies and the Technology Framework. It is crucial for the Technology Mechanism to strengthen its effective linkages with the Financial Mechanism.

5. *Guidance to Technology Mechanism to be flexible, consider evolving needs*

   The G77 and China state that the guidance to the Technology Mechanism should be *flexible, balanced, systematic and comprehensive* in order to respond to the evolving needs of climate technology development and dissemination in developing countries (SBSTA 45 opening plenary).

[7] The four working areas identified in decision 1/CP.21, Para. 67 are: (a) The undertaking and updating of technology needs assessments, as well as the enhanced implementation of their results, particularly technology action plans and project ideas, through the preparation of bankable projects; (b) The provision of enhanced financial and technical support for the implementation of the results of the technology needs assessments; (c) The assessment of technologies that are ready for transfer; (d) The enhancement of enabling environments for and the addressing of barriers to the development and transfer of socially and environmentally sound technologies.

### *Financing*

China's positions on finance in Article 9 of the Paris Agreement include:

1. *Access to and scaling up finance, especially for adaptation*

   The G77 and China emphasize access to adequate finance, especially from the financial-related constituted bodies serving the Convention, and stress its linkage to both pre-2020 actions and successful preparation for the Paris Agreement (APA 1 closing plenary).

   The G77 and China advocate that enhanced action requires enhanced support in the provision of scaled-up financial resources, technology and capacity building. They have yet to see clarity or assurances on the mobilization and provision of scaled up financial resources for developing countries (APA 1-2 closing plenary). "*The strong and united call of the Group of 77 and China for certainty that the Adaptation Fund serves the Paris Agreement has not been fully heard."* (joint plenary of COP 22 and CMP 12; CMA 1).

2. *Additional, adequate and predictable finance from developed country Parties*

   In relation to achieving the international community's US $100 billion goal per year by 2020, the G77 and China emphasize the need for additional, adequate and predictable finance and call on developed country Parties to enhance the provision and mobilization of financial support (joint plenary of COP 22 and CMP 12).

3. *All developing countries to be eligible for support for enhanced climate action*

   The G77 and China oppose exclusion of developing countries from financial support for enhanced climate change actions on the basis of whether they have ratified the Paris Agreement (SBSTA 45). Adaptation funding shall not exclude enhanced actions of developing country Parties to the Convention and non-Parties to the Paris Agreement (APA 1-2 closing plenary). Scaled-up financial resources should include all developing country Parties undertaking climate change actions under the Convention (joint plenary of COP 22 and CMP 12; CMA 1).

4. *Per capita GDP not to be criteria for funding developing country Parties*

   The G77 and China state that the practice of basing funding for developing country Parties on per capita GDP, which has not been decided by the COP, adversely affects some of the most vulnerable developing country Parties (SBI 45 closing plenary).

5. *Accounting of financial resources must aim to provide transparency and consistency, reported information must be comparable and verifiable*

   The G77 and China emphasize that the modalities for accounting for financial resources by developed country Parties to developing country Parties, mobilized through public

interventions in accordance with Article 9, paragraph 7, of the Paris Agreement, must aim to provide transparency and consistency. Information to be reported must also be comparable and verifiable (SBSTA 44 opening and closing plenary, SBSTA 45 opening and closing plenary).

### *Compliance*

China's positions on compliance in Article 15 of the Paris Agreement include:

*Compliance mechanism should be facilitative in nature, and function in a transparent, non-adversarial and non-punitive manner*

The G77 and China recognize the importance of the compliance mechanism for the implementation of the Paris Agreement. They reaffirm that the mechanism shall be facilitative in nature and function in a manner that is *transparent, non-adversarial and non-punitive* as agreed in the Paris Agreement, while also taking into account the respective national capabilities and circumstances of Parties (APA 1 Closing Plenary; APA 1-2 Opening Plenary).

## China's Positions at ICAO on Global Market-based Measures

- The 38th session of the ICAO Assembly (24 September to 4 October 2013) resolved to develop a global market-based measure (GMBM) scheme for international aviation and requested the ICAO Council, with the support of States, report the results of relevant work for decision by the 39th Session of the Assembly.

- On 6 April 2016, the Presidents of China and the United States pledged to work together and with other countries to achieve a successful outcome on the GMBM being pursued under ICAO.

- A High-level Meeting on a Global Market-Based Measure Scheme was held at ICAO Headquarters in Montréal, Canada from 11 to 13 May 2016. For this meeting, China submitted its perspective on the GMBM scheme. The G77 and China also expressed views on the ICAO GMBM scheme in UNFCCC meetings.

- Pursuant to the GMBM negotiations, ICAO has developed the Carbon Offsetting Scheme for International Aviation (CORSIA), an aviation emissions cap and trade regime that countries volunteer the participation of their aviation industry into starting in 2021 and thereafter becomes mandatory for certain states and thereafter becomes mandatory for certain states based on share of global revenue-tonne-kilometers. China is expected to volunteer to participate at the outset of CORSIA starting in 2021 and

would, in any event, be mandatorily required to participate starting in 2027 based on its global share of CORSIA's revenue-tonne-kilometer criteria.

*China's key positions on GMBM include:*

1. *GMBM resolution should fully accord with the principles of equity and CBDR-RC*

   China states in its submission to the High-level Meeting on a Global Market-Based Measure Scheme in May 2016 that the GMBM resolution to be reached by ICAO shall be in full accordance with the principles of CBDR-RC (ICAO, 2016a).

   The differentiation between developed and developing countries should be reflected in *each crucial component* of the resolution. Also, China and other developing countries urged the ICAO to develop *climate* change *measures* in a manner that is consistent with the principles of CBDR and RC, and to align the GMBM with the relevant provisions of the Paris Agreement (ICAO, 2016a).

   Similar statements are also made in a Joint Statement of Argentina, Brazil, China, India, Panama, Russian and Saudi Arabia on International Aviation and Climate Change (2016).

2. *Develop climate measures in manner that consistent with principles of CBDR-RC*

   China and other developing countries urged the ICAO to develop climate change measures in a manner that is consistent with the principles of CBDR-RC, and to align the GMBM with the relevant provisions of the Paris Agreement (ICAO, 2016a).

   This position is also reflected in the Joint Statement of Argentina, Brazil, China, India, Panama, Russian and Saudi Arabia on International Aviation and Climate Change, in which they also indicate that the implementation of a GMBM shall not lead to discrimination against the sustainable development of international aviation of countries, in particular developing countries (ICAO, 2016b).

3. *GMBM not to impose inappropriate economic burdens on developing countries*

   In its submission to ICAO in 2016, China recognizes that the draft proposal presented by the Council President on GMBM may impose inappropriate economic burden on developing countries where the international aviation market is still maturing (ICAO, 2016a). The same view is also reflected in the Joint Statement of Argentina, Brazil, China, India, Panama, Russian and Saudi Arabia on International Aviation and Climate Change (ICAO, 2016b).

4. *Developed countries should take the lead in the post-2020 period, commit and implement absolute quantified aviation emission reduction targets*

   China states in its submission to ICAO that developed countries should take the lead in the post-2020 period, by committing and implementing more ambitious*, absolute* quantified aviation emission reduction targets, while developing countries will enhance their efforts to develop sustainable aviation (ICAO, 2016a).

5. *Unilateral actions by certain developed countries hamper international collaboration*

   China notes with concern the reluctance of some of the developed countries to take the lead to reduce their international aviation emissions dramatically to leave room for the growth of developing countries, and certain developed countries' intention to impose unilateral actions on aviation emissions, against global consensus, that would hamper international collaboration to limit and reduce aviation emissions (ICAO, 2016a).

   Similar statements are made by the G77 and China at the UNFCCC, reiterating the importance of supporting multilateral solutions when addressing emissions from fuel used for international aviation and maritime transport, while taking into account the principles and provisions of the Convention and not on the basis of unilateral measures (SBSTA 44 opening and closing plenary; SBSTA 45 opening and closing plenary).

6. *ICAO GMBM should fully aligned with implementation of Paris Agreement*

   China and the other six countries concur that the work of ICAO related to a GMBM scheme and its implementation must be fully aligned with and support the implementation of the Paris Agreement, with a view to avoid possible incoherence between two intergovernmental organizations under the United Nations. The technical work being undertaken by ICAO should be aligned with the principles and provisions of the Paris Agreement (Joint Statement of Argentina, Brazil, China, India, Panama, Russian and Saudi Arabia on International Aviation and Climate Change (2016)).

7. *Paris Agreement market mechanism to be applied towards ICAO GMBM*

   China in the Joint Statement of 2016 made by seven countries also emphasizes that units arising from UNFCCC mechanisms should be automatically recognized as eligible for ICAO's GMBM and given preference.

8. *Aviation not to subsidize other sectors*

   The use of international civil aviation as a potential source for mobilization of revenue to finance climate change activities in other industrial sectors is unacceptable (Joint Statement of Argentina, Brazil, China, India, Panama, Russian Federation and Saudi Arabia on International Aviation and Climate Change (2016)).

## 8. China's Primary National Energy and Climate Policies

Since the Xi Administration came into power in 2012, the government has emphasized economic reform as a primary focus of the ongoing comprehensive reform program. In this context, energy policy is a priority among top-level decision-making bodies. The Chinese government has in recent years launched a series of initiatives to improve energy market operations and energy supply and demand fundamentals, promote competition, and develop green finance.

In mid-2014, President Xi Jinping announced China will launch an "energy revolution" that promises to address both energy security and pollution. The Energy Revolution targets are to be significantly more ambitious than those in China's NDC. As suggested by its name, China's Energy Revolution will take a more holistic approach to energy policy, contemplating the transformation of society in order to achieve energy and associated environmental goals. The Energy Revolution will encompass the following five areas:

- ***Energy Consumption Revolution*** aimed not only at industry through such methods as demand-side management but also consumer lifestyles.
- ***Energy Production Revolution*** to enhance energy efficiency and lower greenhouse gas emissions in China's current energy infrastructure.
- ***Energy Technology Revolution*** to develop, commercialize and diffuse next-generation energy technologies through innovation.
- ***Energy Institutional Revolution*** to redefine China's institutional arrangements to ensure an enabling environment for low-carbon economic development.
- ***International cooperation*** as a means to support best practices, knowledge and technology transfer.

The policy will advance China's energy policies in areas such as the following:

- Coal consumption will level off during the 13th Five-Year Plan period (2016-2020) and decline afterwards.
- Enhance energy efficiency through a nationally legally binding energy intensity target based on energy consumption per unit GDP.
- A nationally legally binding carbon intensity target to lower carbon dioxide emissions per unit of GDP at least as ambitious as the 60% to 65% reduction from the 2005 levels in China's NDC.
- A nationally legally binding obligation to increase the share of non-fossil fuels in primary energy consumption at least as ambitious as the 20% target by 2030 or sooner in China's NDC.

- Feed-in-Tariff for renewable electricity funded by electricity surcharges.
- Increased targets for new renewable and nuclear electricity installed capacity during the 2015-2030 period of 1200 GW, comprising 180 GW of nuclear, 110 GW of hydropower, 500 GW of wind, and 400 GW of solar (Zhang, 2015).
- Natural gas consumption to increase during the 2015-2030 period by 40 billion cubic meters (Zhang, 2015).
- As coal will remain China's dominant fuel source for decades to come, seek to curb its growth and reduce its use, while promoting clean coal technologies.
- Promoting the development and adoption of electric and plug-in hybrid vehicles.
- Greatly expand public transportation options, increasing ridership and discourage ownership or use of private vehicles.
- Expand China's Eco-city model to integrate low-carbon urban development concepts more deeply and broadly across the economy to include urban planning, construction and management.
- Launch China's carbon emissions trading scheme nationwide.

In 2014, the *Energy Development Strategy Action Plan (2014-2020)* issued by the State Council emphasized the need to transform China's energy industry development path from the traditional supply side strategy to a total demand/consumption side strategy, and to optimize the quality of energy, representing a major shift in China's energy policies and industry practices. The means of control should shift from administrative enforcement to market-based energy pricing, reducing subsidies, and imposition of environmental taxes, which are increasingly identified in regulations and law as the preferred policy instruments.

Towards the goal of energy system reform, different departments within the Chinese government are currently drafting energy regulations and preparing the *Energy Law* and a revision of the *Electric Power Law*. Drafting of the *Energy Law* began in 2005, led by the NDRC and the National Energy Administration, and has proven difficult to complete due to conflicting stakeholder interests. Expected revisions to the *Electric Power Law,* enacted in 1996 and amended in 2003, include relaxation of licensing requirements aimed at encouraging more competitive power markets.

The prevention and control of air pollution has also become an important legislative priority for China's Energy Revolution. In 2015, the Standing Committee of the National People's Congress revised the *Air Pollution Control Law*, which stipulates that quality standards for coal, petroleum coke and biomass fuels should include environmental protection requirements. The *Air Pollution Control Law* requires government departments at all levels to take measures to promote the production and use of clean energy, optimize the use of coal, reduce the proportion of coal in primary energy consumption, and reduce overall air pollutant emissions from coal use.

In this chapter, we survey and map selected Chinese policies that are central to China's Energy Revolution, its War on Pollution, and achieving its greenhouse gas emissions reduction goals.

**Coal**

China is the world's largest coal producer and coal consumer, and is the largest user of coal-fired electricity. As the most carbon-intensive and polluting fuel, curbing the use of coal in electricity generation is one of the most important aspects of energy reform.

***Market Oriented Reform***

- In 1993, China began to gradually liberalize coal prices.
- Since 1996, China implemented guidance prices for thermal coal, establishing the *thermal coal dual price system*.
- From 1999, coal prices were liberalized to all other industries except for thermal coal.
- From 2002, with the abolition of thermal coal guidance prices, China established a reference price for thermal coal prices.
- After 2004, the Chinese government commenced the gradual rolling back of centrally-organized contracting for coal. Enterprises signed contracts by themselves based on supply and demand.
- In 2012, the State Council issued the *Guiding Opinion on Deepening the Reform of the Electricity Coal Market*. The *Guiding Opinion* cancelled key thermal coal contracts starting in 2013, and promoted the principle of a single coal price to be determined by the market. Thermal coal market reform is a key part of the policy's implementation and, with the thermal coal dual price system abolished 16 years after its introduction, the policy represents a significant advance in the reform of coal prices. While the state retains authority to influence coal prices through industry structure and guidance, the last explicit mechanism to control the price of coal was removed, implying that prices are determined by market forces.
- In 2014, Ministry of Finance and the State Administration of Taxation launched a reform of the coal resource tax from a volume tax to an ad valorem tax, which also advanced policies to promote a market price for coal.
- In 2016, the *Energy Development Plan of the 13th Five-Year Plan* set a goal to control the increase of absolute coal consumption from 3.96 billion tons of raw coal to 4.1 billion tons of raw coal in 2020, and a mandatory goal to reduce the share of coal consumption from 64% in 2015 to 58% of primary energy consumption in 2020.

### *Coal Cap*

The *Coal Cap Control* is a total coal consumption limit, formally implemented through voluntary pledges by provinces and municipalities via the planning process. The Coal Cap program is closely associated with, but distinct from, two other policies - the excess capacity rationalization regulations implemented by the NDRC and China's Air Pollution Action Plan under the leadership of the Ministry of Environmental Protection (MEP).

In 2011, the MEP proposed a "total coal consumption control pilot" in the *2011 National Pollution Prevention Work Points*. Then in 2013, *China's Air Pollution Action Plan* outlined the concept of "formulating medium and long-term control targets for national total coal consumption and implementing the management of target responsibility." The *Air Pollution Action Plan* called for Beijing and Tianjin, the Yangtze River Delta, the Pearl River Delta and other regions to strive to achieve negative growth in total coal consumption "by gradually increasing the proportion of external electricity transmission, increasing natural gas supply, increasing non-fossil energy intensity and other measures to replace coal."

Separately, the *12th Five-Year Coal Industry Development Plan* issued by the National Energy Administration (NEA) in 2012 imposed controls on coal consumption, stating that by 2015 both annual coal consumption and production will be controlled at 3.9 billion tons. The *13th Five-Year Coal Industry Development Plan* published in December 2015 raised the total coal consumption target to 4.1 billion tons by 2020. Similar goals are reflected in China's *Energy Development Strategy Action Plan (2014-2020)* issued by the State Council, which proposed that China's coal consumption should be about 4.2 billion tons by 2020.

The *Coal Industry Development Plan* is by nature a coal industry rationalization policy aimed at eliminating excess production capacity, discussed further below. While distinct from the *Air Pollution Action Plan*'s coal cap policy and not formally linked, the rationalization policies operate simultaneously with the coal cap policy and with the force of regulation at the industry level. The 13th Five-Year Coal Industry Development Plan targets are shown in the table below.

**Table 4: China's Coal Production and Consumption Targets**

| Index | Year 2015 | Year 2020 |
|---|---|---|
| **Total coal production (billion tons)** | 3.75 | 3.9 |
| **Total coal consumption (billion tons)** | 3.96 | 4.1 |
| **Eliminate excess production capacity (billion tons/year)** | 0.8 | |

Source: 13th Five-Year Coal Industry Development Plan (2015)

Due largely to economic and energy system dynamics, China's coal consumption peaked at 4.24 billion tons in 2013, and has since declined to 4.12 billion tons and 3.96 billion tons in 2014 and 2015, respectively. China's coal production similarly peaked in 2013, and has since declined. The IEA (2016a), however, projects that China's coal consumption within the medium term may rise due to demand energy market dynamics.

**Table 5: China's Historical Coal Production and Consumption**

| Index | Year 2013 | Year 2014 | Year 2015 |
|---|---|---|---|
| **Total coal production (billion tons)** | 3.97 | 3.87 | 3.75 |
| **Total coal consumption (billion tons)** | 4.24 | 4.12 | 3.96 |

Source: National Bureau of Statistics

In this context, China's submission in 2015 of its Nationally Determined Contribution (NDC) to the Secretariat of the UNFCCC that pledges to peak carbon emissions by 2030 appears highly feasible. Experts have suggested more ambitious goals are possible. In October 2015, the international NGO NRDC working with government and industry stakeholders released *China's Total Coal Consumption Control Program Research Report* proposing that China could reduce coal consumption to 3.8 billion tons by 2020 and achieve a coal production control target of 3.7 billion tons by 2020 (NRDC, 2015). Based on these trajectories, China's climate targets are believed to be achievable.

China's coal cap policies have been developed with the support of broad engagement with industry, government, academic and expert stakeholders. Notably, in 2013, the Natural Resources Defense Council (NRDC), a U.S. NGO with offices in China, launched the *China Coal Consumption Cap Project* bringing together roughly two dozen leading Chinese stakeholder institutions to research national and regional coal consumption scenarios, with attention to topics such as co-benefits analysis, sector coal consumption cap analysis, and planning.

***Excess Coal Production Capacity Rationalization***

As noted in the prior section, China's *12th Five-Year Coal Industry Development Plan* issued by the NEA in 2012 imposed annual coal consumption and production limits of 3.9 billion tons by 2015 with the aim of rationalizing China's excess coal production capacity. The Plan proposed that by 2015 China would form 10 coal enterprises with production scale of 100 million tons each, and 10 coal enterprises with a scale of 50 million tons each, and that these enterprises would account for more than 60 percent of China’s coal production. In the future, China’s coal production mostly will come from large coal mines, and the number of coal mines will continue to be reduced through state intervention. The Plan proposed that by 2015 the number of coal mines in China would reduce to 4,000 or fewer mines averaging 1 million tons per year or more. China's *13th Five-Year Coal Industry Development Plan* maintains the same annual coal production limits of 3.9 billion tons by 2020, and set interim goals to eliminate 800 million tons of excess coal production capacity per year, while increasing advanced coal production capacity by 500 million tons of capacity per year by replacement and optimization. The revised plan relaxes the prior limits by allowing for up to 6,000 coal mines, with 80 percent of total coal production coming from coal mines with capacity over 1.2 million tons per year, and no more than 10 percent of coal production coming from local mines with capacity below 0.3 million tons per year.

In February 2015, the NEA issued the *Guiding Opinion on Promoting the Scientific Development of the Coal Industry*, which aims to improve standards for China's coal production enterprises, closing coal mines with production capacity under 90,000 tons per year, supporting regions required to close coal mines with capacity under 300,000 tons per year, and expediting the closure of coal mines posing serious safety hazards. In March 2015, the NEA and the National Coal Safety Supervision Bureau (NCSSB) issued the *Notice on Eliminating Backward Capacity in the Coal Industry,* which requires that by 2015, 1,254 coal mines should be closed and 77.79 million tons of backward production capacity should be eliminated.

In February 2016, the State Council issued the *Opinion on Resolving Excess Capacity to Achieve the Development of Poverty Relief in the Coal Industry*, and proposed that from 2016, within a period of 3 to 5 years, China will eliminate 500 million tons of coal production capacity, and restructure 500 million tons of coal production capacity. In June 2016, the Ministry of Industry and Information Technology, NDRC, NEA, and the National Coal Safety Supervision Bureau (NCSSB) jointly issued the *Notice on Implementation Plan for Special Action to Eliminate Backward Capacity in the Steel and Coal Industry*. Over ten government agencies including the NEA, NDRC, Ministry of Finance, Ministry of Environmental Protection, People's Bank of China, NCSSB, Ministry of Water Resources, the General *Administration of Quality Supervision, Inspection and Quarantine*, Ministry of Human Resources and Social Security, and State Administration of Industry and Commerce participated in this plan, which calls for the closure of coal mines with capacity under 300,000 tons per year and a history of severe accidents (重大及以上事故), coal mines with capacity under 150,000 tons per year and a history of great accidents (较大及以上事故), and coal mines using banned mining methods. In mid 2016, the NDRC proposed that China eliminate 250 million tons of coal capacity, resettling 700,000 employees (CNR, 2016a).

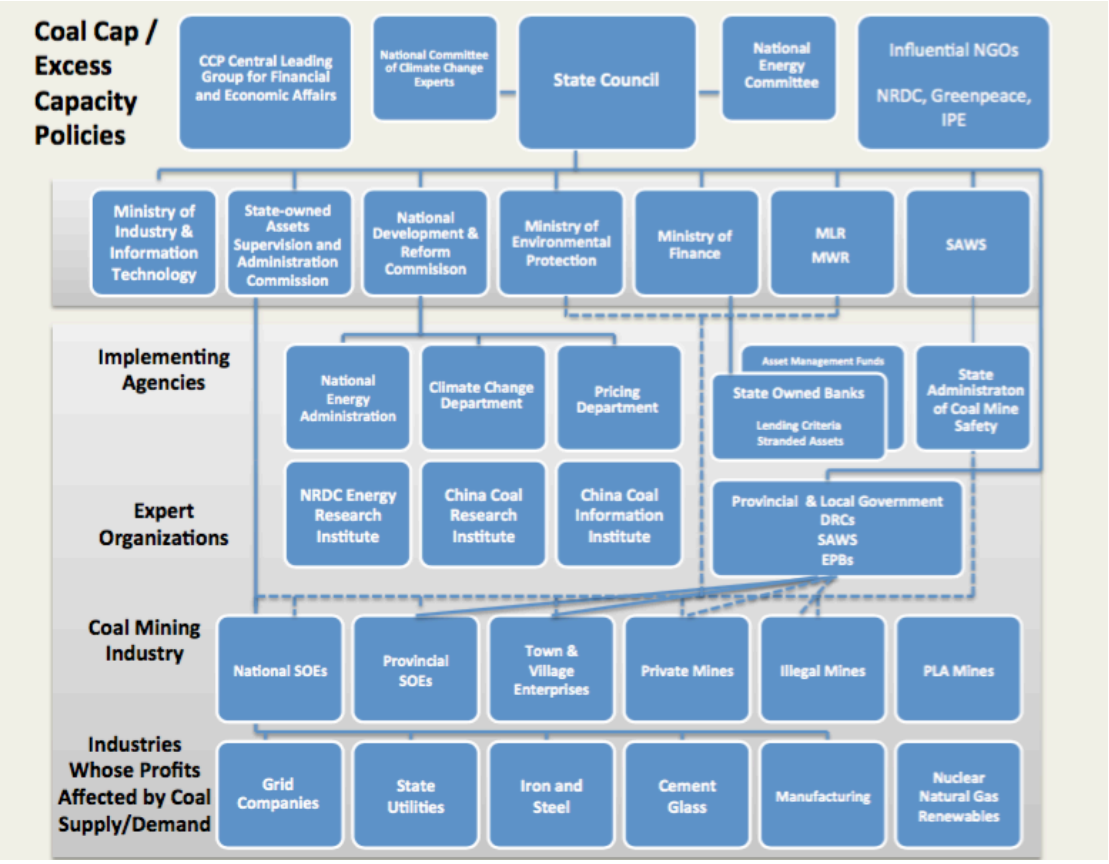
In 2016, China stepped up enforcement of its excess coal production capacity rationalization policies. Local government were asked to set excess production capacity goals, and to sign target responsibility letters, allocating specific tasks to local government agencies and enterprises with a specific timetable. The NDRC sought to hold local governments accountable through administrative means. At the same time, the Chinese government offered subsidies to local government that actively pursue excess coal production capacity rationalization policies, particularly to overcome resistance generated by worker layoffs. According to the *2016 Report on the Work of the Government,* RMB 100 billion yuan in rewards and subsidies were earmarked by the central government for this purpose, which mainly will be used to resettle employees laid off from overcapacity industries such as coal and steel (State Council, 2016). While local governments have traditionally resisted central government policies that result in job loss or interference with locally protected industry, where excess and backward capacity contributes little to employment opportunities and tax revenues, local governments have been more eager to rid itself of what may be perceived as a local burden. In January 2017, the NDRC announced that 250 million tons of coal capacity has been eliminated in 2016 (Peoples Network, 2017).

As suggested by analysis, the central government together with national-level state-owned enterprise posses different interests to those of local government that is aligned more closely with local coal industry enterprises. Beyond employment considerations, many provincial and

local governments or their government officials own and operate smaller-scale provincial, town and village enterprise, private and/or illegal mining operations that are potentially the target of the central government's capacity rationalization policies. In turn, these mines may be affiliated with or supply other local coal-consuming enterprises.

The figure below presents selected stakeholders representing various interests in China's coal cap and excess capacity policies.

**Figure 15: China's Coal Cap and Excess Capacity Policies**




Source: Authors' analysis

## Electricity Reform

### *Market Oriented Reforms*

For over three decades, China has been in the process of reforming its power sector. Prior to 1985, China's power industry was organized as a national power system operated directly by the state. This centrally planned and operated system seriously hampered the development of the power industry and resulted in more than 20 years of severe power shortages.

- In order to correct the power shortage situation, in 1985, the state partially reformed the power industry, creating the potential for non-government bodies to enter the power generation business, while the power grid remained controlled by the state.

- In 1998, China separated government and enterprise in the power sector. In that year, China established a state-owned national power corporation, and abolished the Ministry of Power Industry, transferring the relevant functions to the State Economic and Trade Commission's power division (predecessor to the National Development Reform Commission). While the new State Power Corporation no longer possessed the administrative function of government, it controlled power generation, transmission, and distribution, and controlled the entire power grid and half of the power plants in China.

- Drawbacks of the State Power Corporation's monopoly gradually appeared and in 2002, the State Council issued the *Power Sector Reform Plan* (Mandate No. 5), which called for "the separation of plant and grid, separation of major and minor business, separation of major and other business, and separation of transmission and distribution". It stated the overall goal of reform is "to break the monopoly [in the power sector], introduce competition, improve efficiency, reduce costs, improve the pricing mechanism, optimize allocation of resources, and promote power development." Thus, in 2002, the National Power Corporation was broken into the State Grid Corporation of China, with five regional grid companies and China Southern Power Grid; the big five power generating companies; and four independent ancillary companies.

- In 2003, the State Electricity Regulatory Commission was established in order to separate regulatory and government functions. The *Power Tariff Reform Plan* was promulgated the same year.

- From 2004 to 2014, China's power reform was not progressing smoothly. In 2011, two auxiliary power industry groups, the Power Construction Corporation of China Ltd. and China Energy Engineering Corporation Ltd., were officially founded, and they signed separation agreements with State Grid Corporation and China Southern Power Grid. This ended nine years of the separation of major business and minor business in the power sector.

- In 2015, the State Council issued *Opinion Regarding Further Deepening of the Power Sector Reform* (Mandate No. 9). The 2015 mandate does not go beyond the 2002 mandate (Mandate No. 5), but enhances its operability. The 2015 version requires a distinction between competitive and monopolistic stages, and calls for expanding

competitive business.

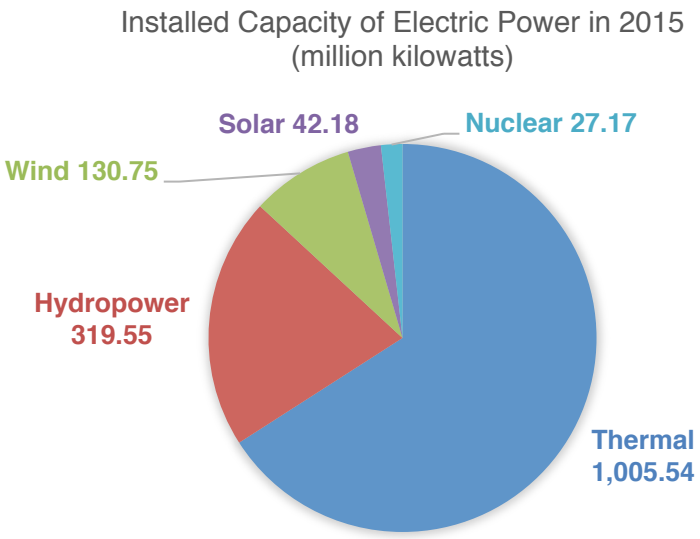
- In the 13th Five-Year Plan (2016-2020), China is to fully implement the power system reform program, to promote the electricity distribution business, construct the electricity market, set up power trading institutions, promote price reform in transmission and distribution, orderly establish and implement the electricity plan, set up an effective electricity market system, improve the linkage mechanism of coal-electricity prices and gas-electricity prices, and implement an electricity price reduction program.

Power reform, always a complex issue for any country, is especially challenging in China because the current power supply exceeds demand and because local government bears much of the responsibility for implementing planning and financing expansion, in the context of a weak central coordination mechanism. The central government's reform program is predicated on the theory that by creating a market for electricity as a commodity, the oversupply situation will resolve itself through price reductions imposed by market dynamics. At the same time, other policies such as efforts to reduce excess capacity in coal usage could provide traditional command and control regulatory means to address immediate oversupply problems in the electricity sector without representing genuine market reform.

### *Power Sector Energy Mix Reforms*

China's five major power generation sources are thermal, hydro, nuclear, wind, and solar. China's thermal power units, accounting for 66 percent of installed capacity, is predominantly coal-fired, resulting in coal representing roughly 60 percent of China's power generation by capacity type, and, due to these being base load plants, 74 percent of China's actual power generation. The graphic below shows total installed capacity and electric energy production by type as of the end of 2015.

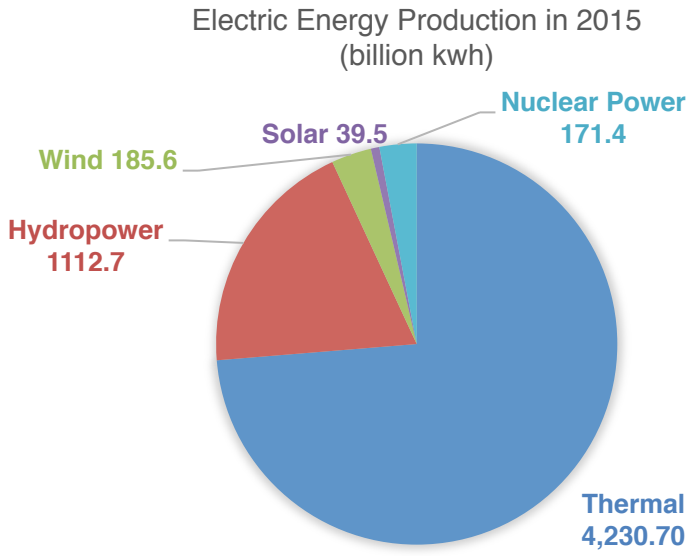
**Figure 16: China's Installed Power Generation**




Source:

Source: National Bureau of Statistics (2015)

**Figure 17: China Power Generation**




Source: National Bureau of Statistics (2015)

As shown above, by the end of 2015, China presently possesses 319.55 million kilowatts of hydropower, 130.75 million kilowatts of wind power, and 42.18 million kilowatts of solar power.

China's *13th Five-Year Energy Development Plan* set a short-term energy structure goal that, by 2020, conventional hydropower installed capacity will be about 380 million kilowatts, wind power installed capacity will be 210 million kilowatts, and photovoltaic installed capacity will be 110 million kilowatts. To achieve these goals, China has sought both to constrain the further growth of coal-fired thermal units, and to promote renewable energy development. China's decentralized power sector poses challenges in implementing these policies. China's grid and power generation enterprises are large, in some cases publicly-traded companies, operating both domestically and increasingly internationally, with sources of revenue independent of the state budget, influential politically, and possess a near monopoly on expertise. Thus, they have gained a degree of independence from central control, frustrating reform efforts. However, efforts to implement smart grid and other new technologies provide the government with opportunities to recentralize control over the electricity sector (Bergsager and Korppoo, 2013), as do China's efforts to control air pollution.

### *Policies Halting Construction of New Coal-fired Power Generation*

In early 2016, the NDRC and NEA published three documents aiming to restrict new construction of coal-fired power generation units:

- *Notice on Promoting Orderly Development of Coal-fired Power in China* (March, 2016) requires strict control of new coal power projects. For provinces with electric power surplus and air pollution prevention and control priority areas, no new coal power generation will be planned or constructed as a general principle. Provinces with inadequate supply of electric power should prioritize non-fossil energy power generation projects.

- *Notice on Further Completing the Elimination of Backward Production Capacity in Coal-fired Power* (April, 2016) requires provinces and cities to further the goal of eliminating backward production capacity in the 13th Five-Year period. The notice set out the conditions for eliminating coal-fired generation plants, and instructed provinces, autonomous regions and municipalities to formulate local plans for the elimination of outdated coal-fired production capacity in the 13th Five-Year period as rapidly as possible, providing targets for specific enterprises and power generation units in some cases. The notice authorized local government to shut down non-compliant power generation units, and directed power grid operators to cease purchasing power from non-compliant coal-fired power plants.

- *Notice on Establishment of Risk Warning Mechanism for Coal-fired Power Planning and the accompanying Risk Warnings for Coal-fired Power Planning and Construction in 2019* (March, 2016*)* provides risk criteria and ranks each province according to this criteria, which in turn determines whether new coal power projects can be issued permits. Under the mandatory ranking matrix, each province is categorized as green (normal), orange (proper coal power projects allowed) and red (new coal power projects not allowed). Under this scheme, three provinces are green (Jiangxi, Anhui, Hainan), one province is orange (Hubei), and 26 provinces are red (Heilongjiang, Jilin, Liaoning, Inner Mongolian, Beijing, Tianjin, Hebei, Shandong, Shanxi, Shanxi, Gansu, Qinghai, Ningxia,

Xinjiang, Henan, Hunan, Sichuan, Chongqing, Shanghai, Jiangsu, Zhejiang, Fujian, Guangdong, Guangxi, Yunnan, Guizhou), meaning that new planned construction of coal power generation should cease across the vast majority of Chinese provinces.

### *Renewable Energy*

The central government has established the development and use of renewable energy as a priority for China. China has adopted a series of laws and policies promoting renewable energy:

- China's Renewable Energy Law, adopted in 2005 and revised in 2009, introduced a feed-in-tariff to support solar photovoltaic, wind, biomass and other renewables with subsidies that vary by region and technology type; directs grid operators to enable renewable generators to sell electricity to the grid; and directs state planning agencies to publish guidance for the development of renewable generation that is the foundation of China's renewable portfolio requirements.

- In 2007, the NDRC published the Mid-Long Term Development Plan for Renewable Energy, which set a goal of increasing the ratio of renewable energy to total energy consumption to over 10% in 2010, and 15% in 2020.

- In 2013, the State Council published the Renewable Energy Development Plan of the 12th Five-Year Plan Cycle (2011-2015), which set specific goals for renewable energy by 2015, including developing 100 renewable energy demonstration cities and 200 green energy demonstration counties.

- In 2016, the NDRC published the Renewable Energy Development Plan of the 13th Five-Year Plan Cycle (2016-2020), which set goals for the share of non-fossil energy in primary energy consumption at 15% and 20% in 2020 and 2030, respectively; and the share of power generated by renewable energy at 27% of total generating capacity by 2030.

The central government subsidizes renewable power generation through a feed-in-tariff and provides other subsidies and tax benefits for project development and for equipment manufacturing. Under China's feed-in-tariff, renewable energy generators receive an electricity price based on the price of coal-fired power generation, a credit for low-sulfur emissions electricity generation, and an additional subsidy that varies based on the type of renewable technology and region. The renewable subsidy component is funded by electricity price attachment fees collected from industrial and commercial power consumers, and deposited into the Renewable Energy Fund administered by the National Energy Administration via the grid operator. Figure 23 depicting environmental and renewable energy subsidies illustrates the flow of subsidies.

The Chinese government's support for renewable energy was recently strengthened by the *Notice on Enhancing the Criteria for the Collection of the Renewable Energy Fund* (January, 2016) issued by the Ministry of Finance and NDRC, which, starting January 1, 2016, increased the electricity price attachment fees collected on electricity from commercial users in most provinces and cities from RMB 1.5 cents per kilowatt-hour to RMB 1.9 cents per kilowatt-hour to

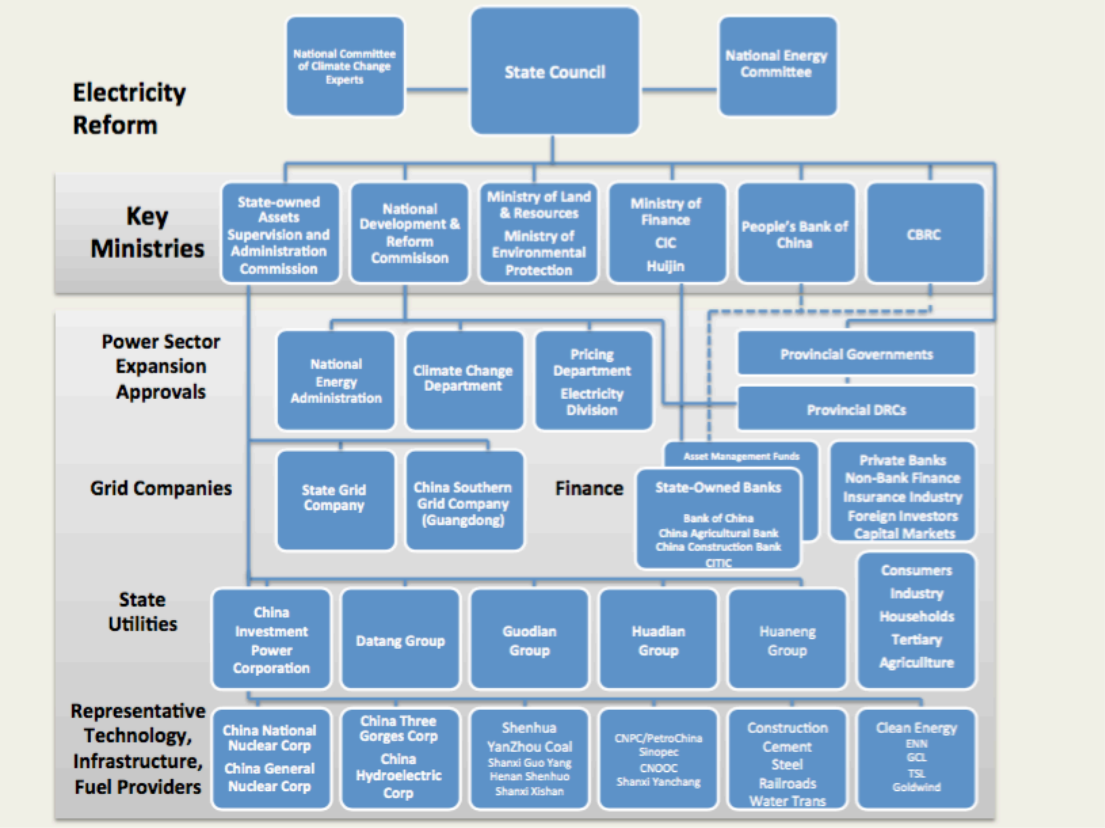
fund subsidies for renewables (Note: residential and agricultural consumers are not subject to these fees). Under this policy, more than RMB 19 billion yuan of subsidies can be collected. China's goal is that by 2020 renewable energy power generation should be market-driven, and electricity produced by renewable energy should be competitive with the price of electricity produced by coal without subsidies. Thus, the state plans to phase out subsidies for renewables after 2020.

As noted above, the majority of renewable energy subsidies come from electricity price attachment fees, but power generators subject to these fees are chronically delinquent in payment, which has resulted in delays in the payment of subsidies to renewable generators. According to Li Yangzhe, Deputy Director of NEA, by the end of first half of 2016 a total of RMB 55 billion yuan of subsidies were owed to renewable generators but unpaid for lack of funds (China Energy News, 2016). Therefore, a large number of grid-connected power generation projects that are eligible for subsidies have been unable to collect them due to inadequate electricity price attachment fee collection practices.

Notwithstanding these problems, as a result of China's renewable policies, China has become the world's leading investor in renewable energy and associated low-emissions energy technologies in recent years. China invested US $78.3 billion in these technologies in 2016 (REN21, 2017). The International Energy Agency (IEA) projects that in the next five years China will install 36 percent of the worlds' hydro electricity generation capacity, 40 percent of world's wind energy, and 36 percent of world's solar power (IEEFA, 2017). With the launch of the One Belt One Road policy, China' new energy industry is poised to expand even further internationally.

The figure below presents selected stakeholders representing various interests in China's electricity reform.

**Figure 18: China's Electricity Reform**




Source: Authors' analysis

## Oil

### *Price Reform*

Following the foundation of the People's Republic of China, China's refined oil prices have been controlled by the central government. From 1998, the state began setting refined oil prices taking into account market-oriented price factors, yet the state retains control over pricing of this important commodity.

- In 1998, the former State Planning Commission (succeeded by the NDRC) introduced the *Crude Oil and Refined Oil Price Reform Program*, which required that both domestic crude oil and refined oil prices should follow market prices in Singapore. In 2001, to further improve the domestic refined oil price mechanism, a new pricing mechanism was introduced whereby refined oil prices should follow the New York and Rotterdam markets in addition to the Singapore market. When the international oil prices fluctuate within a range of 5 to 8 percent, domestic oil prices would remain unchanged, but when they exceeded this range, the NDRC is then authorized to adjust the retail price.

- From 2003 to 2008, due to price volatility and rapid price rises, NDRC frequently intervened to control the price of refined oil prices.

- In 2009, the NDRC announced a new *Refined Oil Price Formation Mechanism Reform Program*, which stipulated that when average crude oil prices fluctuate beyond 4 percent for 22 consecutive working days in the international market, it may adjust domestic oil prices accordingly. However, the adjustment cycle proved too long to keep pace with international crude oil price fluctuations at that time.

- After 2013, the NDRC announced a revised *Refined Oil Price Formation Mechanism,* which shortened the adjustment cycle for refined oil prices from 22 working days to 10 working days. It also eliminated the 4 percent average oil prices fluctuation in the international market as a threshold or trigger, and broadened the varieties of international crude oil markets that domestic refined oil prices followed.

Critics of the current system charge that the cost plus pricing method for oil protects the profits of oil refining enterprises, and do not truly reflect actual domestic supply and demand (An et al., 2015). Oil pricing is one of many examples of subsidies that the fossil fuel industry receives from the state. Below in this chapter we engage in a broader discussion of subsidies.

***Market Reform of Fossil Fuels Sector***

- In 2014, the State Council issued *Guidance on Innovation Investment and Finance Mechanism in Key Areas to Encourage Social Capital Investment*, which explicitly encouraged social capital to participate in the construction and operation of oil and gas pipelines, storage facilities and coal storage and transportation. The Guidance is significant in that it invites broader participation and potentially transparency into a sector that is dominated by state-protected monopolies.

- The *Oil and Gas System Reform Program* led by NDRC and NEA, which is said to be issued at the end of 2016 but as of the time of publication was not publicly available, is focused on the three-dimensional reform of the entire industry supply chain, especially the oil and gas price formation mechanism, mineral rights, pipeline networks, import and export rights, use rights for crude oil, reform of government functions, and reform of state-owned enterprises.

***Quality of Fuel Oil***

Motivated by public concern over air pollution, China has started to actively promote improvements in vehicle fuel oil starting in 2013.

In 2013, the MEP issued the *Limits and Measurement Methods for Pollution Emissions from Light Vehicles (Level V)* for the purpose of implementing the *Environmental Protection Law* and *Air Pollution Prevention Law*, to control pollution of motor vehicle pollutants and improve ambient air quality. The document shall be implemented from January 1, 2018. Level V limits are strict, following European standards, and more rigorous than is typical compared with other developed countries, yet implementation of these standards remains a problem for China.

In 2015, the NDRC and other ministries jointly promulgated the *Program of Accelerating the Upgrading of Refined Oil* in accordance with the *Air Pollution Control Action Plan*. From January 1, 2016, the eastern part of China should be fully supplied with national standard Level V vehicle gasoline and diesel. The program also transitioned the entire country to Level V standards one year earlier than originally planned by January 1, 2017. At the same time, the program supports oil refining enterprises by expediting the approval of projects designed to meet these standards as well as future Level VI gasoline and diesel national standards development.

**Natural Gas**

As with crude oil, the state sets the price of natural gas using the cost plus pricing method to maintain the profits of the state oil and gas industry, balanced with consumer interests. The central government has, however, permitted experimentation with market-based approaches that may inform broader reform in the natural gas sector.

- In December 2012, the NDRC issued the *Notice of Reform of Natural Gas Price Formation Mechanism in Guangdong and Guangxi Provinces* in order to pilot a dynamic price adjustment mechanism that reflects market supply and demand fundamentals. The notification provides a fomula for natural gas prices based on the price of fuel oil and liquefied petroleum gas.

- In June 2013, the NDRC issued the *Notice on Adjusting the Price of Natural Gas* to link pipeline natural gas prices with fuel oil and liquefied petroleum gas prices, and to implement government-guided price ceilings.

- In January 2015, the Shanghai Municipal Government approved the establishment of the Shanghai Oil and Gas Trading Center, to be joined by companies, as an important step in promoting energy system reform and promoting the marketization of natural gas prices.

**Energy Efficiency**

Energy efficiency plays a central role in China's energy policy, and achieving China's energy security and future contributions to greenhouse gas emissions reductions depend upon its continuing ability to increase energy efficiency. China's energy efficiency since the opening of its economy in the early 1980s has markedly improved. With the exception of the 2002-2004 period, during which period China's energy intensity increased due to explosive electricity demand driven by economic growth and urbanization, China's energy efficiency improved steadily from 1980 to 2002, and then again from 2006 to 2012.

During the 1980 to 2002 period, China averaged a 5 percent annual increase in efficiency (Levine et al., 2010). During this period, China limited energy demand growth through aggressive energy-efficiency programs organized by the central government, working closely with provincial and municipal authorities. According to An et al. (2015), "[t]his involved (1) tight oversight of industrial energy use, including monitoring requirements for large users, closing inefficient facilities, and promoting efficient technologies, (2) financial incentives for energy-efficiency investments and cogeneration, (3) information services at the national, provincial, and local levels, including the creation of over two hundred energy conservation service centers, (4)

education and training, and (5) research and development (at modest funding levels) and demonstration projects (at more significant levels)."

In response to the reversals in energy efficiency in the early 2000s brought about by rapid growth, the NDRC redoubled its efforts by issuing the *Medium and Long-Term Plan for Energy Conservation* in 2004. The NDRC set a target to reduce China's energy intensity of GDP by 20 percent between 2005 and 2010, an annual average of 3.6 percent per year, and to continue to improve efficiency at this rate through 2020 (An et al., 2015). From 2004, China resumed its previous trajectory of increasing energy efficiency, achieving annual increases of 3.3 percent per year in energy efficiency from 2004 to 2010 (Hart and Ma, 2014). However, these results were achieved in part by government closing inefficient power and industrial facilities by administrative decree. Although China later permitted new generation only on condition that inefficient power production was closed, these command and control measures were less than optimally efficient for local economies and for industry (Hart and Ma, 2014).

Resumption of energy efficiency measures and ongoing restructuring of China's economy away from energy-intensive industries and towards domestic consumption and the service sector has been instrumental in achieving recent energy efficiency goals. Since 2006, large industrial enterprises have set mandatory energy consumption targets, and received financial support from the central government to implement these plans. In December 2011, the NDRC and 11 other national agencies jointly launched the *Program of 10,000 Enterprises Implementing Energy-saving and Low-carbon Action*. These 10,000 enterprises have annual energy consumption over 10,000 tons of standard coal or are other large energy consumers identified by government for inclusion in the policy that have annual energy consumption of at least 5,000 tons of standard coal. In 2010, a total of over 17,000 enterprises accounted for more than 60 percent of total energy consumption in China, which are the focus of the government's energy-saving programs (NDRC et al., 2011). The 12th and 13th Five-Year Plans for Energy Efficiency have also promoted the development of China's energy services market, encouraging the growth of China's energy efficiency industry.

Despite the reversal in the early 2000s, China has been highly successful in its overall energy efficiency efforts. According to the IEA (2016b), from 2000 to 2015, China's energy consumption per unit of GDP decreased by 30 percent, or on average 2 percent per year. The 13th Five-Year Plan (2016-2020) sets a goal to reduce energy consumption per unit of GDP by 15 percent by 2020, as compared with 2015 levels.

**Transition from Pollution Charges to Environmental Taxation**

Since 1982, China has levied charges for sewage, waste gas, solid pollutants and noise through the local Environmental Protection Bureaus. However, due to lack of strict enforcement and local government intervention, collection of these charges has been weak and uncollected charges represent a serious problem. In contrast, tax collection and management is more stringent, and comparatively more insulated from local government intervention as it is supervised by central government agencies answering to the Ministry of Finance and the State

Administration of Taxation. Therefore, after years of evaluation and debate,[8] the NPC Standing Committee at the end of 2016 approved the *Environmental Protection Tax Law*, to be implemented from January 1, 2018, which transitions from China's traditional system of pollution charges to a system of environmental taxes.

With this change, the agency responsible for collection will change from Environmental Protection Bureaus to the local offices of the State Administration of Taxation, which should improve collection significantly. Yet, as the administration of pollutant discharge requires certain expertise, it will be difficult for tax authorities to implement environmental taxes alone. Therefore, cooperation with environmental protection departments will remain important, and will require the development of protocols for coordination and information sharing among tax departments and environmental protection departments.

### *Pollutant Charges*

According to the *2003 Pollutant Charges Levy and Use Management Approach*, the collection and use of pollution charges must strictly adhere to the "revenue and expenditure at two lines" principle, meaning that the Environment Protection Bureaus collect the fees and then turn them over to the Ministry of Finance.

The polluter is required to report the type and quantity of pollutants discharged to the environmental protection department of the local people's government above the county level.

After the amount of pollution charge is determined, the environmental protection department responsible for the examination and approval of the discharge of pollutants delivers a discharge fee payment notice to the polluter. The polluter must then pay the charge to the designated commercial bank within seven days from the date the notice is received. The commercial bank then remits the proceeds to the central finance agency and the local finance department according to the proportions set out in regulation.

### *Environmental Taxes*

Under the *Environmental Protection Tax Law* implemented from January 1, 2018, enterprises, institutions and other production and business operators who directly discharge air pollutants, water pollutants, solid waste, and noise to the environment are liable to pay environmental taxes.

The lower limit of the tax will be the prevailing pollution charges. The tax on air pollutants is between RMB 1.2 to 12 yuan for each pollution unit (每污染当量). The tax on water pollutants is between RMB 1.4 to 14 yuan for each pollution unit as defined in in the *Environmental Protection Tax Law*. The tax on solid wastes is between RMB 5 to 1000 yuan per ton depending on waste type.

[8] See, e.g., *Opinion on Strengthening Key Environmental Protection Work* issued by the State Council in 2011, which proposed that China "actively promote environmental tax reform, and research the introduction of an environmental tax". The Communist Party's 18th Plenary Session also emphasized "changing environmental fees to environmental taxes" as an important element of China's tax system reform.

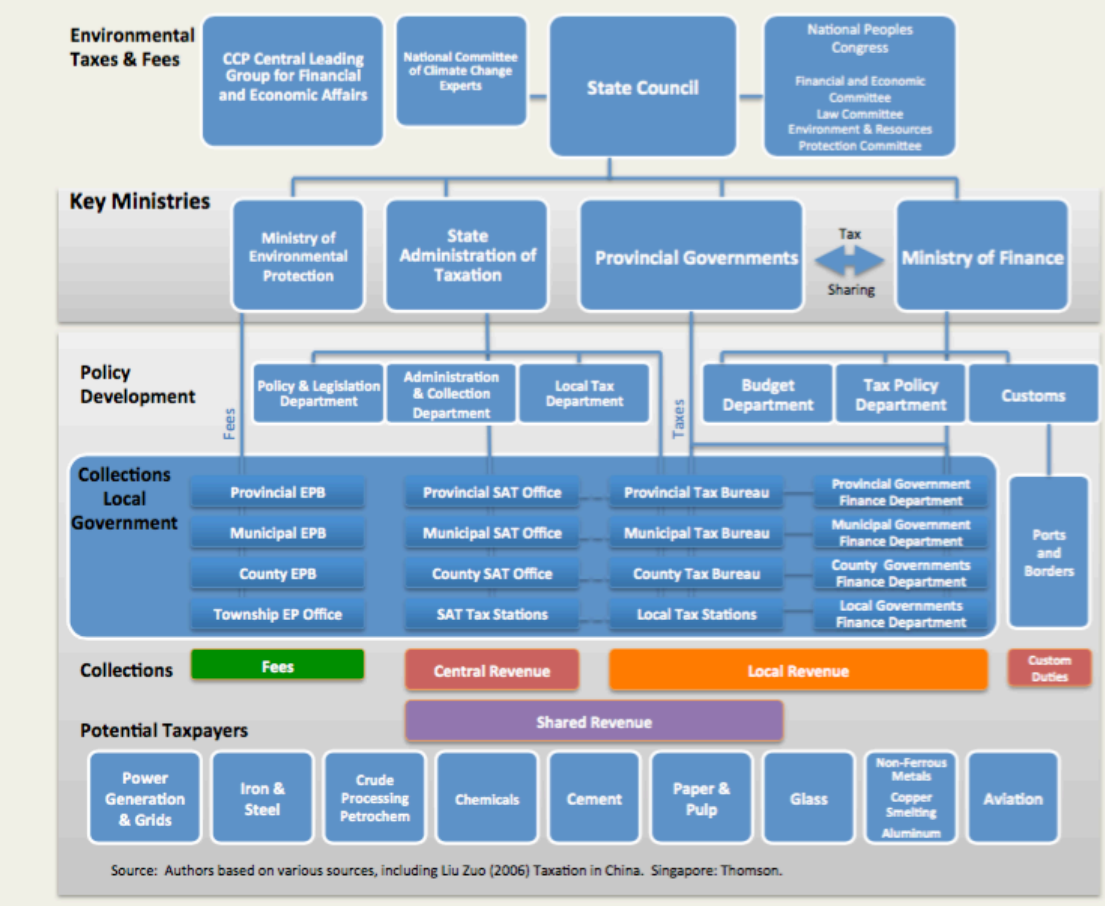
The determination and adjustment of the tax amount for covered air and water pollutants is performed by provincial governments, autonomous regions and municipalities, taking into account environmental carrying capacity, the current levels of pollutant discharge and the economic and social ecological development of the region. Amounts are to be reported to the same level People 's Congress Standing Committee for approval, and to the Standing Committee of the National People's Congress and the State Council for record keeping purposes.

The environmental protection tax is collected and managed by the tax authorities. The department of environmental protection shall be responsible for monitoring and regulating pollutants in accordance with environmental protection laws and regulations. Local governments at or above the county level are to establish a working mechanism for the division of work among tax authorities, environmental protection authorities and other relevant units to strengthen the collection and management of the environmental protection tax and ensure timely and full tax payment. The departments of environmental protection and the tax authorities are to establish tax-related information sharing platforms and coordination mechanisms.

China's policy and academic circles have debated the introduction of a carbon tax over the past decade. Lou Jiwei, Minister of the Ministry of Finance, stated in March 2016 that China will not introduce a separate carbon tax at this time, however carbon will be taxed in the current tax scheme through environmental taxes or resource taxes (Xinhua News, 2016).

The figure below presents selected stakeholders representing various interests in China's environmental tax and fee policies.

**Figure 19: China's Environmental Taxes and Fees Regime**




Source: Authors' analysis

## Pollutant Emission Permits and Emissions Trading System (ETS)

### *Emission Rights Fees and Pollution Charges*

Emission rights fees and pollution charges are distinct concepts. Emission rights fees reflect the use of environmental resources and embodies the "who uses a resource pays" principle. Pollution charges represent compensation for the environmental damage caused by pollutant discharge. It reflects the "polluter pays" principle according to the actual discharge amount. Following the transition from environmental charges to environmental taxes in 2018, the MEP is to undertake further policy reforms introducing a pollutant emission permit model featuring elements of an emission trading system.

### *Pollutant Emission Trading System*

China has experimented with pollutant emission permits since the 1980s, with the first emission trading of COD carried out in Shanghai in 1987. In 1990, China organized pilot SOx and NOx air pollutants emission trading in 16 cities. Since 2007, the Chinese government organized pilot projects on paid use of emission permits and emissions trading in 11 provinces and cities including Tianjin, Jiangsu, Zhejiang, Chongqing, Hubei, Hunan, Guangzhou, and Inner Mongolia.

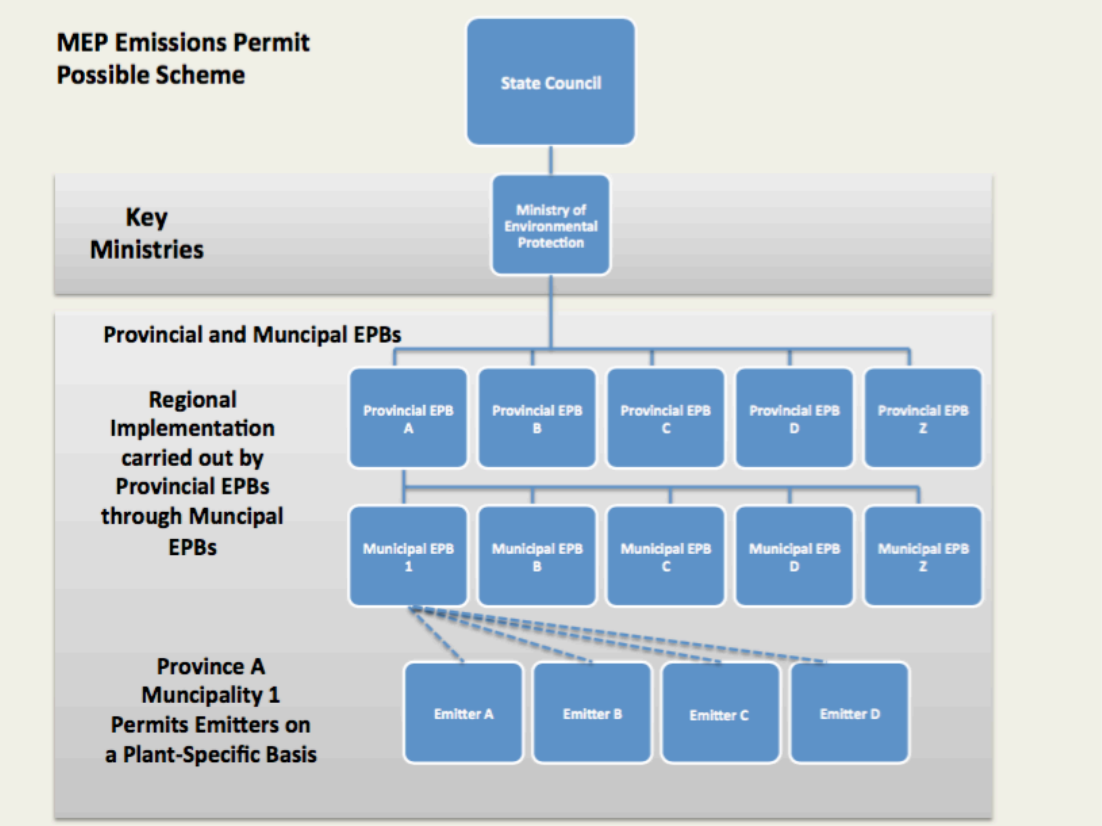
On the basis of these pilot programs and other experience, the State Council issued the *Guiding Opinion on Further Piloting the Paid Use of Emission Permits and Emissions Trading* in August 2014, which proposed that by 2017 a system of paid emission permits and emissions trading will be established in selected areas. In 2015, the Ministry of Finance, NDRC and the MEP jointly issued the *Interim Measures for the Administration of Emission Permits* Income to clarify the administration of income received through the emission permits system. Revenues from the emission rights programs are included in the general public budget and expected to be used for pollution prevention and control programs (*Ministry of Finance, NDRC, Ministry of Environment Protection, Interim Measures for the Administration of Emission Permits, July 2015*), however the control and use of these revenues has been a subject of contention among government ministries.

In November 2016, the State Council approved the *Implementation Scheme for Pollutant Emission Permits* as the basis to regulate enterprises and institutions' pollution emissions. Implementation is to be carried out by MEP before 2020. The *Implementation Scheme* proposed the following ideas:

- Reform China's current total emissions control system from pollutant targets set by the administrative regions to be based on specific enterprises and institutions, and implement more stringent limits.
- Integrate pollutant emission permits with the environmental impact assessment system.
- Local governments at or above the county level will issue pollutant emission permits which specify pollutant types, concentrations, emission amounts, discharge direction, with related specifications governing pollution control facilities, and environmental management requirements.
- A comprehensive pollutant emission permit will cover air pollutants, water pollutants, and in accordance with the law, gradually extend to cover other pollutants.
- The government will achieve full coverage of fixed pollution sources gradually, starting with the thermal power and paper industries. By 2017, key industries and overcapacity industry enterprises identified in the *Air Pollution Prevention Action Plan* and *Water Pollution Prevention Action Plan* will be issued pollutant emission permits, and by 2020 national implementation will be substantially complete.

The figure below presents one possible approach to implementation of the Ministry of Environmental Protection's Emissions Permit Scheme.

**Figure 20: MEP Emissions Permit Scheme**




Source: Authors' analysis

### *Carbon Emission Trading System*

China began experimenting with carbon emissions trading in 2011. The NDRC is the agency responsible for carbon trading appointed by the State Council. The NDRC designated seven provinces and cities - Beijing, Shenzhen, Shanghai, Guangdong, Tianjin, Hubei, Chongqing - to carry out pilot carbon emissions trading.

- In December 2014, the NDRC issued the *Interim Measures for the Management of Carbon Emissions Trading* to promote the establishment of a unified carbon market nationwide. The provincial carbon trading authorities, in accordance with the criteria set by the NDRC, proposed emission sources in their respective administrative areas to be included in their programs and report to the NDRC.

- In November 2015, the General Administration of Quality Supervision, Inspection and Quarantine and the Standardization Administration of China issued 11 national

standards including the *General Rules for Industrial Enterprises to Account and Report Greenhouse Gas Emissions. These standards and other* greenhouse gas accounting and reporting requirements cover power generation, power grid operations, magnesium smelting, aluminum smelting, iron and steel production, civil aviation, flat glass production, cement production, ceramics production enterprises, and chemical production enterprises.

- In January 2016, the NDRC issued the *Notification on Implementation of the Key Work for the Launch of the National Carbon Emission Trading Market*, specifying: (1) creation of a list of enterprises to be included in the first phase of the national carbon emissions trading system, which will cover the petrochemical, chemical, building materials, steel, nonferrous metals, paper, electricity, aviation and other key sectors; (2) accounting, reporting and verification standards to be based on historical carbon emissions; (3) development and selection of third-party verification bodies and personnel; and (4) strengthening of capacity building.

- Starting in 2015, the NDRC has issues a series of greenhouse gas accounting standards to support China's emissions trading system. The series mainly comprises two parts, one is the *Provincial Level Greenhouse Gas Accounting Guidance (Trial)* and its corresponding training materials, and the other is the *Industrial Level GHG Emission Accounting Method and Report Guidance (Trial).* Both are issued by NDRC. The industrial level guidance follows the provincial level guidance, for they provide the operational method for GHG accounting to support the final provincial level GHG inventory report.

  The *Industrial Level GHG Emission Accounting Method and Report Guidance (Trial)* is actually a series of separate guidance documents for specific industrial or carbon reducing applications. Each of these *Industrial Level GHG Emission Accounting Method and Report Guidance (Trial)* firstly identifies the application scope and reference document, introduces terminology and definitions, and then specifies accounting boundaries, accounting methods, quality guarantee and recordkeeping requirements. Each specifies report content and format, and corresponding modeling and parameter default values.

- In October 2016, the State Council published the *13th Five-Year Work Plan for Greenhouse Gas Emission Control* that specifies climate and energy related measures and targets between 2016-2020 in order to ensure peaking of $CO_2$ emissions by 2030.

- In January 2017, the NDRC issued the *Notice on the Third Batch of National Low-carbon City Pilot Work*, which directed 45 cities (districts and counties) to carry out low-carbon city pilots starting in 2017, including carbon management and data collection regimes, as preparation for national emissions trading.

**Table 6: NDRC Sector-specific MRV Methodologies**

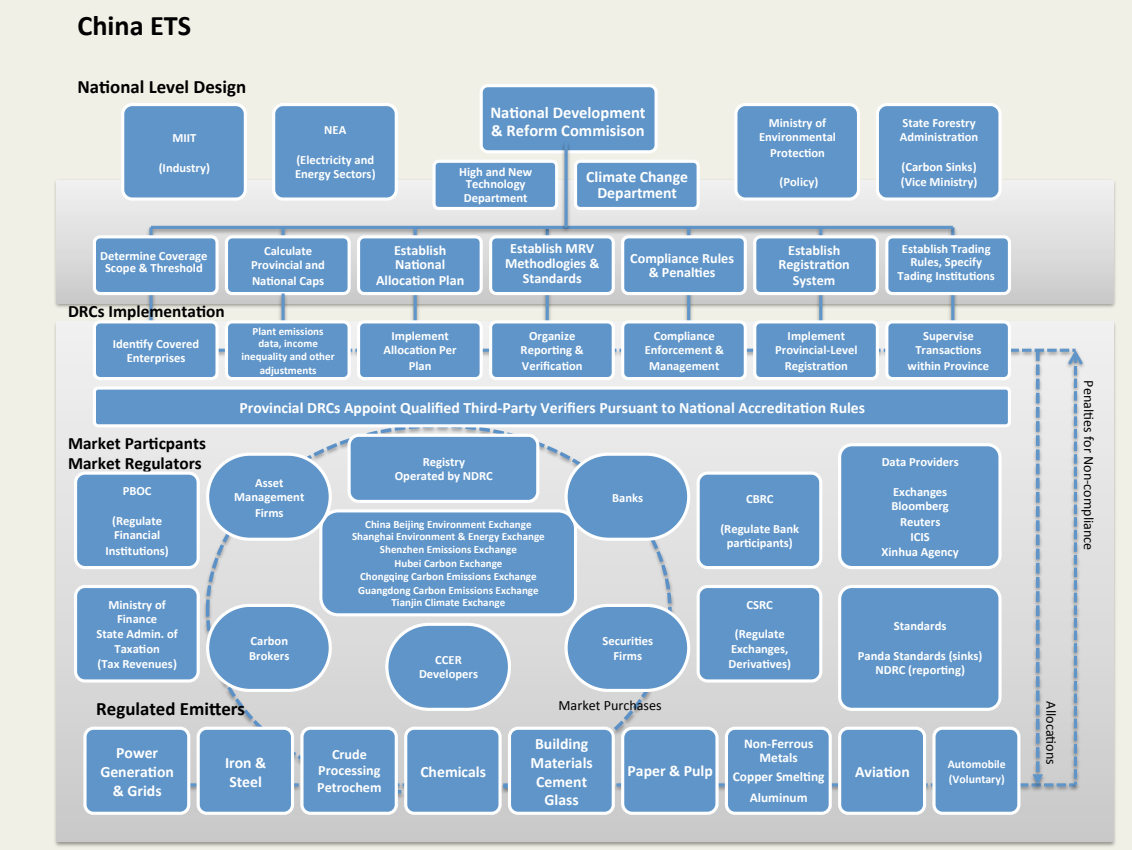
| Date of Issuance | Sector or Industry |
|---|---|
| October 2013 | Power-Generation |
| | Power Grid |
| | Steel Production |
| | Chemical Industry Production |
| | Electrolytic Aluminium |
| | Magnesium Smelting |
| | Plate Glass |
| | Cement Production |
| | Ceramic Production |
| | Civil Aviation |
| December 2014 | Petroleum and Natural Gas Production |
| | Petroleum and Chemical Industry |
| | Independent Coking |
| | Coal Production |
| July 2015 | Papermaking and Paper Products |
| | Other Nonferrous Metals Smelting and Rolling |
| | Electronics Manufacturing |
| | Machinery Manufacturing |
| | Mining |
| | Food, Tobacco, Beverage and Tea Refining |
| | Public Building Operation |
| | Land Transport |
| | Fluorination Industry |
| | Other Industries |

Source: Authors' analysis of NDRC website

From a design point of view, both the pollution emissions trading scheme and the carbon emissions trading market are divided into two levels. At the primary level, governments issue emission rights to covered industrial sectors, either for free or at a cost determined by the government or set by auction. In the secondary market, a broader set of covered emitters and unregulated traders may engage in trading of government allocated allowances and offset credits that may be accepted by regulators towards emission reduction obligations.

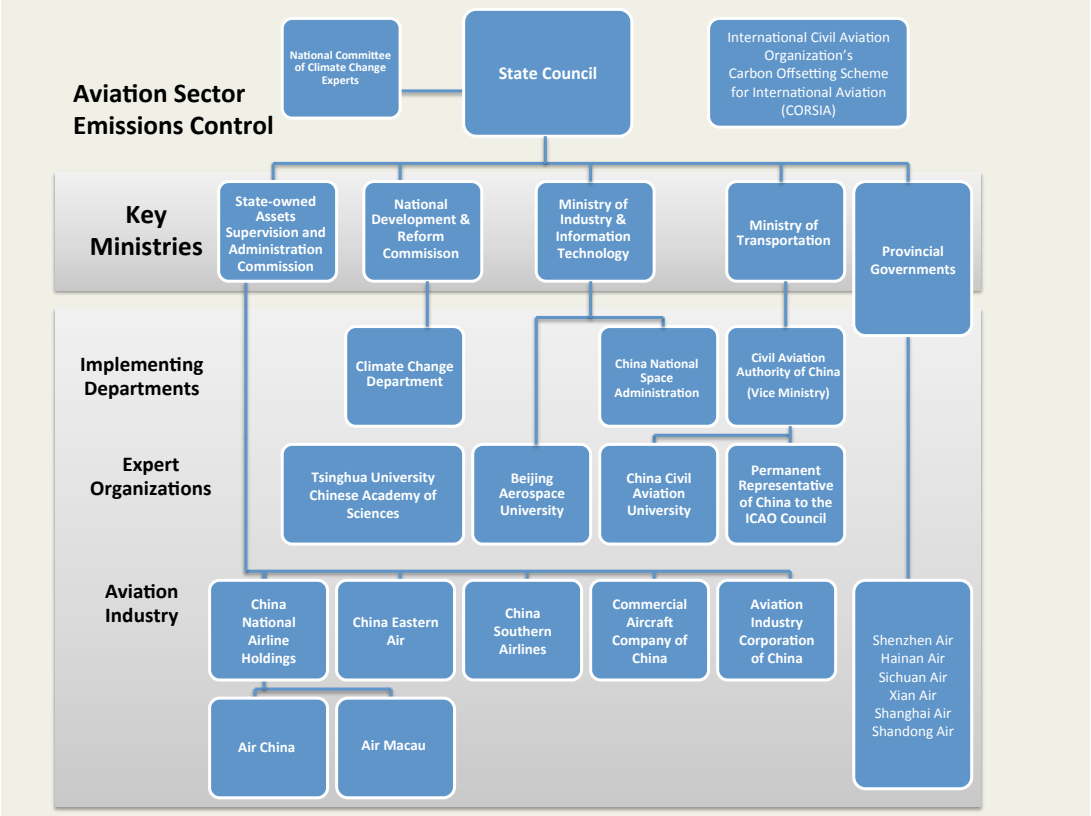
The figures below present selected stakeholders representing various interests in China's Emissions Trading System and in its aviation sector emissions control policies. The aviation sector will be subject both to China's domestic regulations, and potentially the International Civil Aviation Organization's Carbon Offsetting Scheme for International Aviation (CORSIA), an aviation emissions cap and trade regime that China is expected to volunteer the participation of its aviation industry into starting in 2021 and thereafter would become mandatory for China starting in 2027 based on its global share of CORSIA's revenue-tonne-kilometers criteria.

**Figure 21: China's Emissions Trading System**




Source: Authors' analysis

**Figure 22: China's Aviation Sector Emissions Control Policies**




Source: Authors' analysis

## Subsidies

China grants various types of subsidies to industry for purposes of general support as well as to achieve environmental objectives. China's overall system of subsidies has undermined the transparency of market dynamics and, we believe, on the whole detracts from achieving environmental goals. Here we summarize important subsidies polices relating to environmental policy. As our discussion of overall subsidy policies in this section below suggests, environmental subsidies must be viewed in the context of China's entire system of subsidies to evaluate their actual impact.

### *Subsidies to Clean Coal Power Generation*

Coal-fired thermal power generation receives state subsidies for employing flue gas desulfurization, denitrification, dust removal and other environmental pollution abatement measures. The standard subsidy is RMB 0.027 yuan per kilowatt-hour.[9] The grid settles the subsidies every month based on volume of power generation, and makes payment in real-time, not in arrears. In China, 4,230.7 billion kwh thermal power was produced in 2015 (National Bureau of Statistics, 2017). If every unit of electricity received subsidies in accordance with the above criteria, this amounts to about RMB 110 billion yuan (roughly US $16 billion) in subsidies to the coal industry in that year.

To place this in context, renewable energy generation subsidies offered by the state potentially reach RMB 19 billion yuan, or less than a fifth of subsidies available to coal. Considering that coal remains China's lowest cost electricity resource, and that coal prices have been declining both nationally and globally, subsidies of this magnitude to the coal industry produce perverse incentives to favor coal power generation, and represent a windfall to both the power generation industry and the coal industry given that coal-fired power prices do not reflect their full environmental costs to society.

While the ostensible purpose of these policies is to reduce dirty emissions associated with burning coal, the economic result is to make it less costly - or more profitable - to burn coal. According to the research conducted by the Ministry of Finance in 2015, the external cost of coal to the environment, ecology and public health is RMB 302 yuan per ton, and the cost of loss caused by climate change is RMB 160 yuan per ton, while China's current environmental charges and resource taxes imposed on coal use are only RMB 45 yuan per ton (Fiscal Science Research Institute, 2015; Feng, 2016).

These direct and indirect subsidies are felt throughout the coal supply chain, not just at the combustion stage. The adverse environmental impacts affect the mining and transportation stages, including by making it profitable to mine lower grades of coal and from smaller mines with inadequate safety standards. Worse, China's thermal power plants are known to install pollution abatement equipment in order to qualify for these subsidies, but to not actually use the equipment in actual operations. In the second half of 2016, special inspections by the NDRC

[9] See the press conference of the NRDC on April 3, 2014 “Strengthening the Supervision of Environmental Protection Electricity Price to Promote the Improvement of Atmospheric Quality”, which stated that the standard subsidy is RMB 0.027 yuan per kilowatt-hour, comprising 1.5 cents for desulfurization, 1 cent for denitrification, and 0.2 cents for dust removal.

and MEP found that 605 of 759 inspected coal-fired power generation enterprises, or nearly 80 percent, were not in compliance with their emissions pollution abatement obligations (CNR, 2016b).

In addition to "clean" coal power generation subsidies, the coal industry also receives other direct and indirect subsidies. According to IISD and GSI (2015), subsidies to coal production in China reached RMB 35.7 billion yuan in 2013, excluding any preferential credit support to the industry provided by the state banking industry, which they estimate to be between RMB 3.5 and 35.7 billion yuan. The study identified 18 separate subsidies to coal extraction operations in China over the 2013–2015 period, and quantified 11 of them. The most significant subsidies by value are: temporary tax and fee relief granted by provincial and local governments, investment in fixed assets financed from the state budget, compensation for coal mines that are shut down under the coal capacity rationalization plan (described above), value-added tax (VAT) rebates including VAT rebates for coal bed methane production, and direct subsidies to publicly-listed coal companies. Coal subsidies such as credit support, investment in fixed asset from the state budget and direct grants may be more detrimental than other subsidies (e.g., VAT rebate exemptions or compensation for the shutdown of mines) by driving investments that lock in coal use over the long-term.

### *Renewable Energy Subsidies*

As described previously, the central government subsidizes renewable power generation through a feed-in-tariff and provides other subsidies and tax benefits for project development and for equipment manufacturing. Under China's feed-in-tariff, renewable energy generators receive an electricity price based on the price of coal-fired power generation, a credit for low-sulfur emissions electricity generation, and an additional subsidy that varies based on the type of renewable technology and region. The renewable subsidy component is funded by electricity price attachment fees collected from industrial and commercial power consumers, and deposited into the Renewable Energy Fund administered by the National Energy Administration via the grid operator.

The vast majority of renewable energy subsidies come from renewable energy electricity price attachment fees, however fees can not be fully collected from power consumers via grid operators, which has led to delays in the payment of subsidies to the power generator. According to Li Yangzhe, deputy director of NEA, by the end of first half of 2016 defaulted subsidies totaled RMB 55 billion yuan (China Energy News, 2016). Thus, a large number of grid-connected power generation projects that are eligible for subsidies are not receiving support, which has held back growth of the renewable energy industry.

Because the electricity price attachment fees are borne by industrial and commercial enterprises, the central government constrains the level of subsidies in order to keep electricity prices low in order to stimulate the economy. In addition, renewable energy subsidies are paid according to standardized criterion that changes over time yet may lag technology or fail to keep up with market dynamics by several years. Since the cost of renewable energy technology is declining, the Chinese government plans to discontinue subsidies for wind power and photovoltaic power generation by 2020 (NEA, 2017).

### *Consumption Side Subsidies*

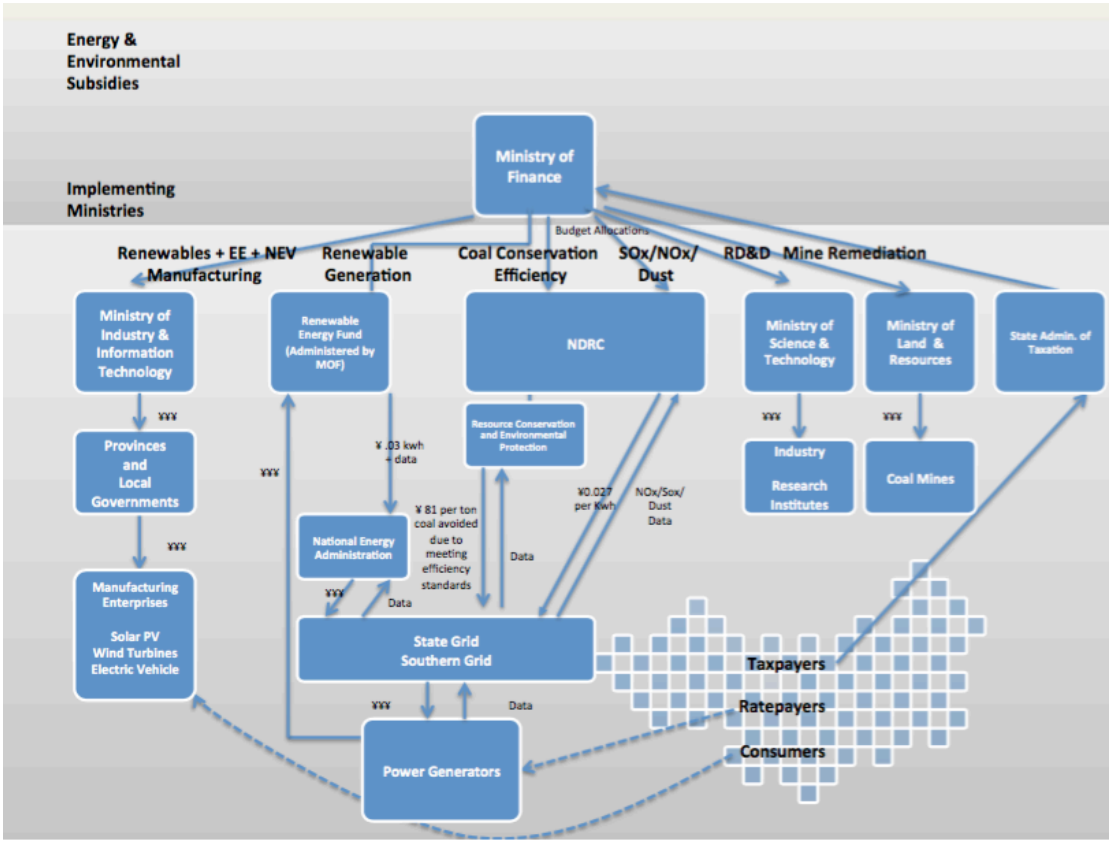
In order to expand China's new energy market, China has introduced subsidies to spur consumer demand for new energy products, such as electric vehicles. The 13th Five-Year Plan (2016-2020) sets ambitious goals for China to accelerate its new energy consumption revolution. The 13th Five-Year Plan aims to promote the expansion of low-carbon transport, especially new energy vehicles and to develop China's electric vehicle industry, as well as to raise building energy efficiency standards, and promote green buildings and building materials. China has also included new energy vehicles in the *Made in China 2025* strategy, which will provide additional government support. *Under the Made in China 2025* program, China will support the development of electric vehicles and fuel cell vehicles, aiming to promote Chinese brands competing in the international marketplace.

In September 2016, the Ministry of Finance released the *Report on New Energy Vehicles Subsidies Investigation*, and it shows that new energy vehicle (e.g., electric vehicle) sales increased from 7,200 in 2010 to 330,000 units in 2015. Despite the marked increase in sales, the new energy vehicle subsidies scheme has been marked by corruption and abuse. The report identified five enterprises that violated laws and regulations in defrauding the energy vehicles subsidies scheme of more than RMB 1 billion yuan, as well as numerous smaller enterprises that engaged in fraud but were not identified (Ministry of Finance, 2016). Examples of fraud included new energy vehicle companies over-reporting the number of vehicles produced as of the end of 2015, by applying for motor vehicle licenses ahead of actual production and thereby obtaining central financial assistance without having produced the vehicles.

In light of the rapid development of electric vehicle technology and the widespread abuse of the subsidies program, the government has announced that subsidies standards for new energy vehicles will be stricter and the amount will decrease each year. The *Notice on the Financial Support Policy for the Promotion and Application of New Energy Vehicles from 2016 to 2020* published by the Ministry of Finance, Ministry of Science and Technology, and Ministry of Industry and Information Technology in 2015 specified that subsidies in 2017 and 2018 will reduce by 20 percent relative to 2016 levels, and subsidies in 2019 and 2020 will reduce by 40 percent relative to 2016 levels, and subsidies will be eliminated altogether in 2020 for new energy vehicles.

The figure below presents selected stakeholders in China's energy and environmental subsidies policies.

**Figure 23: China's Energy and Environmental Subsidies Policies**




Source: Authors' analysis

### *China's Economy-wide System of Subsidies*

Evaluating China's energy and environmental subsidies as well as the effectiveness of its broader climate and environmental policies in general requires taking China's economy-wide system of direct and indirect subsidies into account.

The influence of subsidies is particularly acute for policies that are intended to incentivize clean production or set a price for carbon, such as China's nascent national carbon emissions trading system. In particular, for China's carbon markets to succeed, regulators must place a degree of trust in the market to set prices for carbon allowances. Yet, the question of whether China's carbon market will operate effectively hinges also to some extent on whether China's regulators will allow robust competition to prevail in domestic markets for goods and services more generally. State-owned enterprises are protected from full competition by government rules limiting entry, and a host of preferential policies, including the provision of subsidies. Although China has embarked on reforms aimed at strengthening markets, the state still maintains a powerful central planning apparatus that controls the costs of many of the most important basic inputs at artificially low prices in favor of state-owned enterprises, including capital (interest rates on savings and lending), energy (fuels and electricity), water and land, all of which affect

the entire economy and environmental incentives. Protection of industry and the thicket of state subsidies create their own incentive structure that a carbon price signal is unlikely to be able to overcome and become the primary incentive driving change. If regulators are unwilling to expose state-owned enterprises to full competition in the marketplace, are they likely to expose them to the discipline of carbon markets, or allow these markets to operate independent of their authority based on market factors?

For state-owned enterprises, any market price for carbon will compete with state subsidies. The sheer magnitude of China's subsidies could negate the effects of the carbon price. As described below, one study of China's 100-plus national-level state-owned enterprises estimated that from 2000 to 2009 all of their profits were attributable to subsidies.

China's state-owned enterprises, as arms of the state, typically enjoy monopoly or oligopoly status, and affiliation with the state has shielded them from the full range of competitive pressures and regulatory requirements other firms face. Most notably, state protection relieves these firms from facing hard budgets or the possibility of bankruptcy. Sheng and Zhao (2013: xxii) argue that well over 100 percent of China's SOE profits are accounted for by subsidies during the 2001 to 2009 period. The sources of these subsidies are varied, including reduced costs for land and fuel, tax breaks, and monopoly pricing.

One of the most important subsidies relates to land. SOEs are not paying the full rental value of land. Based on the market values for industrial land using nationally averaged prices, Sheng and Zhao (2013: xxi-xxii) estimate that SOE underpayment in land rents alone accounted for 67.2 percent of SOE nominal profits from 2001 to 2009.

SOEs are given reduced rates for borrowing capital from state-controlled banks. SOEs enjoy a 10 percent lower interest rate for M&A financing, compared to private borrowers in China, pay two-thirds less interest on corporate bonds, and enjoy a discount of 200 to almost 300 basis points on operating loans (Ferri and Liu, 2009; Sheng and Zhao 2013: 65-68). When scale is taken into account, large and medium size private enterprises were charged 6 percent higher than state-owned enterprises of corresponding size, and small private enterprises are charged a 9 percent premium relative to their counterparts (Sheng and Zhao 2013: 66-67, citing Liu and Zhou, 2011). The state similarly takes advantage of preferential financing terms by dictating interest rates for government bonds and requiring state banks to purchase and hold them to maturity, resulting in over 70 percent of government bonds being held by state banks. Low borrowing rates to state industry are made possible by state banks paying low interest rates to depositors pursuant to government regulation (Lardy, 2012: 83, 98-100; Walter and Howie, 2012: 116-119). Sheng and Zhao (2013: xxii) estimate that avoided interest payments accounted for 47 percent of the profits of state-owned enterprises from 2001 to 2009.[10] Thus the state-banking system is used to subsidize state-owned enterprises, the cost of which is borne by Chinese households in the form of low interest on their deposits, and private borrowers who pay inflated interests rates to compensate for bad loans to state enterprises.

[10] Lardy (2014: 108 and Appendix B) challenges the interest rate data and methodology used by Sheng and Zhao (2013), and cites other Chinese government data suggesting that while SOEs may be charged less than private borrowers, the difference is likely less than commonly argued.

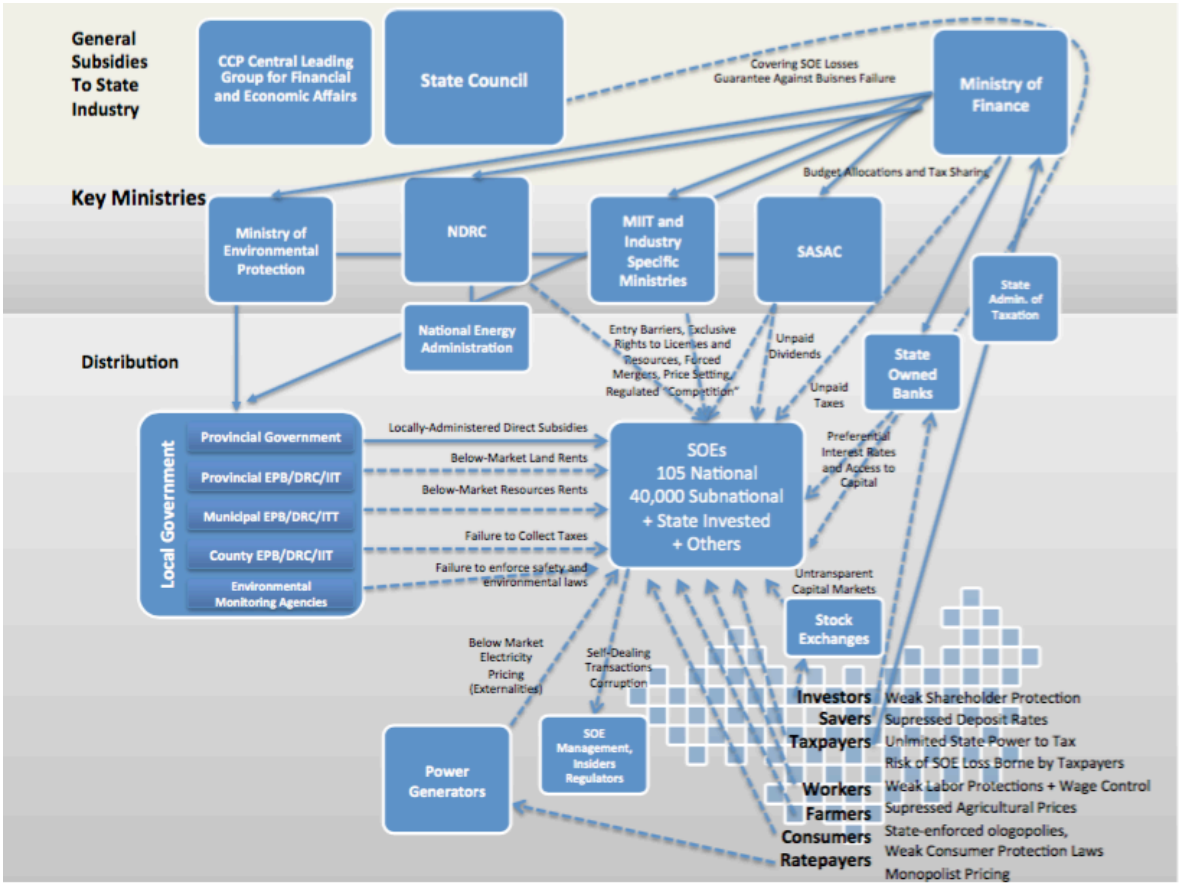
SOEs pay less in taxes. From 2007 to 2008, the average tax burden of 992 SOEs surveyed was 10 percent, compared to 24 percent paid by private enterprises (Sheng and Zhao, 2013: xxiii). Resources taxes on petroleum, natural gas and coal are also lower for state-enterprises. For example, the state imposed less than a 2 percent charge on the price of oil for sate enterprises, far less than the 12.5 percent imposed on joint ventures (Sheng and Zhao, 2013: xxii).

SOEs also enjoy direct cash subsidies such as payments to oil producers "to ensure the market supply of crude oil and petroleum products", as well as in-kind subsidies, such as the grant of licensees or other privileges at not cost. For example, state-owned telecommunications enterprises receive valuable radio frequency licenses for which they are not charged. Certain subsidies are difficult to quantify yet substantial, such as in the case of SOEs that use their political influence to disregard environmental laws, resulting in the shifting of externalities to the public.

Finally, SOEs enjoy monopoly or oligopoly pricing for various goods and services. For example, China maintains monopolies for tobacco, salt, civil aviation, petroleum and petrochemicals, power generation and transmission, coal, and telecommunications. Although Articles 7 and 8 of the Anti-Monopoly Law authorize state monopolies, they also prohibit abuse of monopoly privileges, a prohibition that has proven an impossible task for regulators to enforce. Due to their monopoly status and state price policies, state-owned petroleum and natural resources companies, for example, charge higher than international market prices for their products (Sheng and Zhao: 2013: 69-73).

The diagram below illustrates the various types of subsidies and the transfer of wealth from Chinese citizens directed by the state to industry.

**Figure 24: Direct and Indirect Subsidies to State Industry**

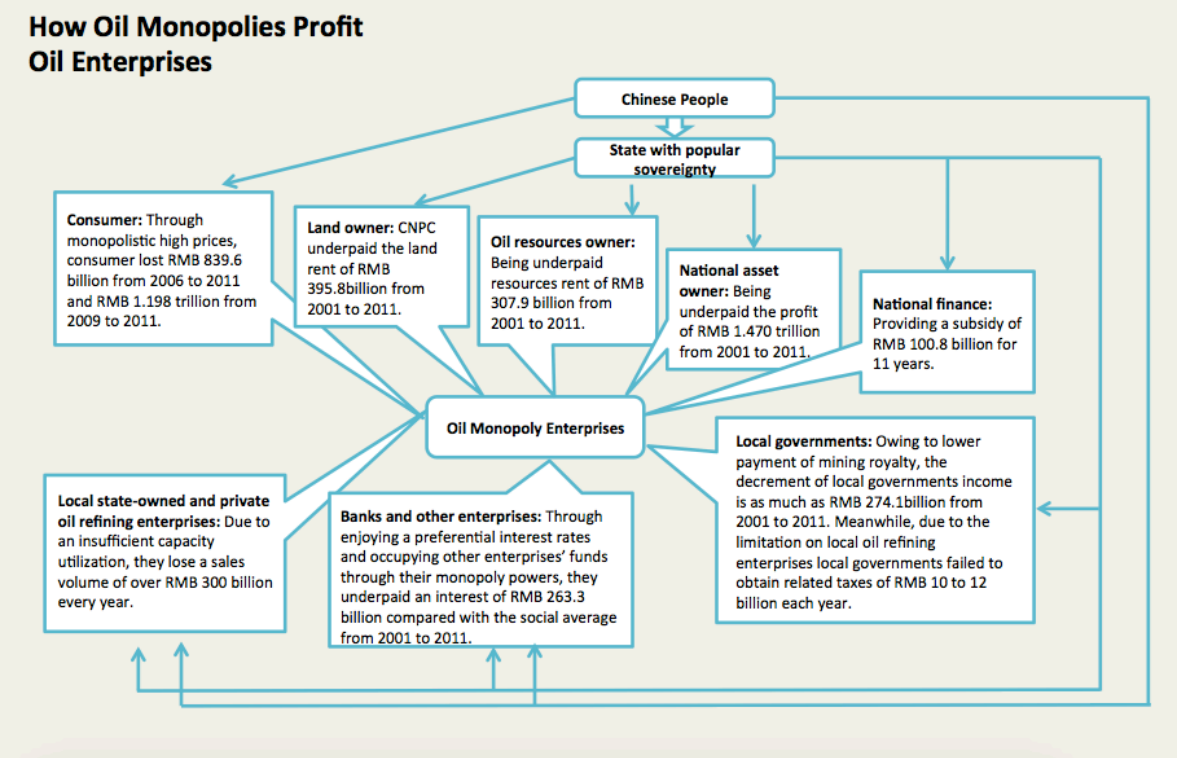



Source: Authors' analysis

Subsidies and protectionist policies are pervasive throughout China's entire economy. From the perspective of climate policy, subsidies and protection from competition granted to the fossil fuel industry directly undermine other clean energy policies. They also represent significant losses to Chinese society. Chinese media has reported that China's central government paid out RMB 573.4 billion yuan (US $84.2 billion) in direct fuel subsidies for the public transport, forestry and fishing sectors alone; roughly 20 times the central government budget for energy-saving and environmental protection in 2015 (Liu, 2016). As noted above, IISD and GSI (2015) estimate subsidies for coal production amounted to RMB 35.7 billion yuan in 2013, excluding consideration of credit support, which could double the estimate. Sheng and Qian (2015: viii) estimate that the efficiency loss due to administrative monopoly in the oil industry alone cost China RMB 3.477 trillion yuan from 2001 to 2011. During this period, China's three national oil companies failed to surrender their profits of RMB 1.4701 trillion yuan (Sheng and Qian, 2015: viii). Thus, paradoxically, from an economic viewpoint, these firms operate at a net loss, yet they continue to accumulate surplus capital, representing a transfer of wealth from citizen-consumers to state enterprises, while at the same time severing proper economic incentive for

environmental protection. The diagram below represents China's subsidies to state oil enterprises based on the work of Sheng and Qian (2015).

**Figure 25: Subsidies to China's State Oil Enterprises**




Source: Sheng and Qian (2015).

Under the auspices of the U.S.-China Strategic and Economic Dialogue, China and the United States committed to undertake a peer review of their respective fossil fuel subsidies programs with the aim of eliminating these subsidies in fulfillment of pledges made at the 2009 G20 summit in Pittsburgh where leaders committed to "phase out and rationalize, over the medium term, inefficient fossil fuel subsidies". The outcome of the peer review, which was reported at the 2016 G20 meeting in Hangzhou, included assessments of the cost of fossil fuel subsidies and proposals to reform and eliminate these subsidies (Liu, 2016). The table below presents a summary of selected subsidies identified by the China peer review and proposed reforms.

**Table 7: China's Review and Proposed Reform of Selected Fossil Fuel Subsidies**

| | Estimated Cost (RMB 100m yuan) | Inception date | Timetable for Reform | Proposed Reform |
|---|---|---|---|---|
| **Subsidies for the exploration, development, and extraction of fossil fuels** | | | | |
| Consumption-tax policy of "refund after payment" for refined oil produced by oil and gas field enterprises for own use | 27 | 2009 - | Near to mid-term | Move point of taxation for refined oil |
| Exempting China National Petroleum Corporation (CNPC) from land-use tax | Not currently available | 1989 - | Mid to long-term | Abolish policy |
| Exempting China National Offshore Oil Corporation (CNOOC) from land-use tax | Not currently available | 1990 - | Mid to long-term | Abolish policy |
| **Subsidies for refining and processing fossil fuels** | | | | |
| Consumption tax exemption for oil consumed by refined oil manufacturing enterprises for own use | 1 | 2009 - | Near to mid-term | Move point of taxation for refined oil |
| **Subsidies for power and heat generation** | | | | |
| Exempting thermal power stations from land-use tax in cities and towns | Not currently available | 1989 - | Mid to long-term | Abolish policy |
| VAT exemption for heating fees for heat supply enterprises serving residences | Not currently available | 2011 - 2015 | Mid to long-term | Abolish policy |
| Exempting heat-supply enterprises from real-estate tax and urban land use tax | Not currently available | 2011 - 2015 | Mid to long-term | Abolish policy |
| **Subsidies for fossil fuels used in transport** | | | | |
| Series of subsidies derived from petroleum fuels price and tax reform | 940 | 2009 - | Mid to long-term | Improvements |
| **Subsidies for fossil fuels used in residential sector** | | | | |
| Preferential tax-rate policy of VAT on coal gas and liquefied petroleum gas | Not currently available | 1994 - | Mid to long-term | Abolish 13% preferential VAT rate |

Source: Liu, 2016.

## Green Finance

China defined the development of a "green finance system" as goal for the first time in the *Ecological Civilization Reform Program* issued by Central Committee of the Communist Party and the State Council in September 2015. China's *Outline of the 13th Five-Year Plan* adopted by the National People's Congress in March 2016 also stated the goals to “establish a green financial system, develop green credit, green bonds and establish green development funds”. China's green finance program includes promoting lending to ("green credit") and investment in companies producing environmentally-friendly goods ("green investment"), encouraging the establishment stock indexes utilizing environmental criteria, encouraging banks and enterprises

to issue bonds to support green projects ("green bonds"), supporting the establishment of environmental development funds, requiring listed companies to disclose environmental risks, establishing environmental rating systems and cost accounting as part of an impact assessment system, and actively promoting international cooperation in various fields of environmental finance.

In August 2016, China's Leading Group for Central Comprehensive Reform adopted the *Guiding Opinion on Building a Green Finance System*, which emphasized that development of green finance is not only an important measure to achieve green development, but also a driver of China's supply-side structural reforms. In August 2016, the PBOC, NDRC, MEP and seven other ministries issued the *Guiding Opinion on Building a Green Finance System*, the publication of which signaled momentum towards development of China's green finance system policy framework. In the *Guiding Opinion*, green finance encompasses financial services aimed at addressing a wide range of environmental goals: environmental improvement, climate change, resource conservation, energy saving, clean energy, green transport, and green buildings.

Here we outline the development of specific policies encompassed within green finance.

**Green credit** Since 2007, China has formulated a series of policies to encourage and promote financial institutions to actively carry out green credit. The framework for the green credit system comprises four parts: (1) *Green Credit Guidelines* (CBRC, 2012), (2) *Green Credit Statistics System* (CBRC, 2013), (3) Green Credit Evaluation System (including *Green Credit Implementation Key Evaluation Indicators* (CBRC, 2014) and *Guidelines on the Supervision of Banking Financial Institutions* (CBRC, 2014)), and (4) green credit policies developed by the banks themselves. In 2013, 29 banks signed the *China Bank Green Credit Commitment*. In 2014, banking financial institutions jointly initiated the China Banking Association Green Credit Professional Committee. In April 2015, the Green Finance Committee (GFC) of the China Society for Finance & Banking was established. By the end of June 2016, China's 21 major banking institutions' green credit balance reached RMB 7.26 trillion yuan, accounting for 9 percent of all loans at that time (CBRC, 2016).

**Green bonds** The People's Bank of China, NDRC, China Securities Regulatory Commission, the three major policy agencies in the green bonds field, and other agencies and financial institutions have issued a series of policies governing green bonds, which define green projects, green bond issuance standards, and ways to raise and use funds. In December 2015, the PBOC, Green Finance Committee and NDRC separately published polices concerning green bonds. The PBOC issued *Announcement No. 39* to introduce green bonds in the inter-bank bond market, creating a financing channel for financial institutions to raise funds for green industry projects through the bond market. The Green Finance Committee released the *Green Bond Supporting Project Catalog (2015 Edition)*, which is intended to provide prospective issuers with standards for green projects. The NDRC issued the *Green Bond Guidelines* to define the scope and application of green bonds, establish bond audit requirements, and provide for guarantees, subsidies and other supporting measures. In early 2016, Shanghai the Stock Exchange and Shenzhen Stock Exchange jointly issued the *Green Bonds Pilot Notice*,

promoting green bonds within the existing corporate bond framework, and further clarifying rules governing green bonds.

Accompanied by the internationalization of the Renminbi, in October 2015 People's Bank of China listed the equivalent of US $1 billion in green bonds on the London Stock Exchange, raising its own green projects according to the internationally accepted *Green Bond Principles*. The projects accredited by qualified third parties covered clean energy, biomass power generation, urban waste and sewage treatment and other fields. It was the first time that Chinese financial institutions issued RMB-denominated green bonds. Since 2016, the development of green bonds in China has been growing rapidly. By August 2016, issuances of green bonds in China exceeded RMB 100 billion yuan, making. China the world's largest green bond issuance market. According to preliminary estimates, by 2020 China's green bond market is expected to reach RMB 5.7 trillion yuan (China Financial and Economic News, 2016).

**Green stock index and related products** are under development and can be divided into three categories: environmental, social and governance indexes (ESG), environmental protection industry indexes, and carbon efficiency index. By the end of October 2015, the China Securities Index Company compiled 16 green indexes. In addition, the Shenzhen Stock Exchange and Shanghai Stock Exchange have published documents on ESG information disclosure, which are mainly voluntary in nature. About 20 percent of listed companies make actual disclosure of ESG performance, though reporting quality varies and the reports are generally not verified by independent third party evaluation (Ma, 2016).

**Green industry funds** invest at least 60 percent of their assets in green investments. At the national level, funds such as the Silk Road Fund and Green Silk Road Private Equity Investment Fund have established leadership positions in the field. At the local level, Zhejiang, Guangdong, Inner Mongolia and other local governments have established local industry funds for financing energy saving enterprises. By the end of October 2015, there were 32 funds related to environmental protection, with 15 index funds and 17 active management funds (Ma, 2016).

**Green insurance** in China mainly refers to environmental pollution liability insurance. Environmental pollution liability insurance insures against pollution accidents that cause damage to third parties. The *Environmental Protection Law* clearly encourages the development of environmental pollution liability insurance. The *Ecological Civilization Reform Program* also proposed the establishment of a compulsory environmental liability insurance system in order to improve environmental risk management. By the end of 2015, there were nearly 4,000 companies in 17 provinces, autonomous regions and municipalities that had contracted environmental liability insurance (Ma, 2016).

### *Promoting Green Finance in the International Market*

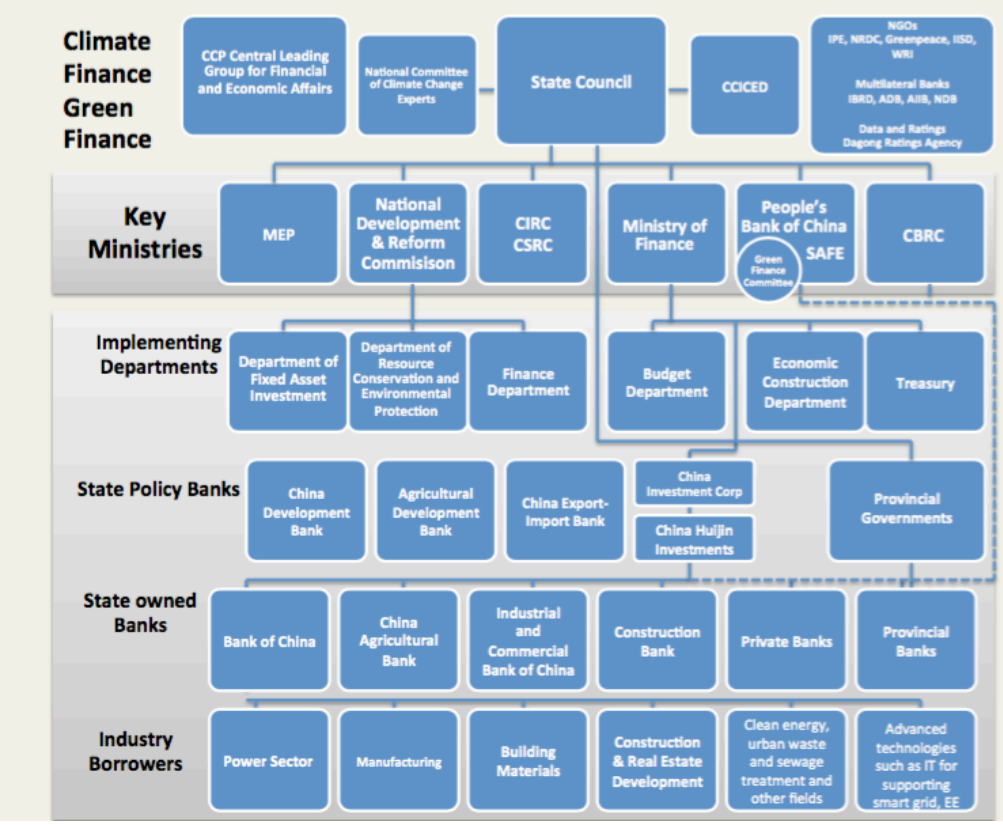
China is seeking to expand its leadership in global environmental governance through green finance. In December 2015, China hosted the G20 Green Finance Study Group, co-chaired by the People's Bank of China and the Bank of England, with the United Nations Environment Program (UNEP) serving as the secretariat. In 2016, the group issued the *G20 Green Finance Comprehensive Report*, which defined the purpose, scope and challenges of the development of green finance in the international context. The work of the study group involving five areas,

including the three specialized areas of banking, bond market, and institutional investors, and two cross-cutting issues of risk analysis and index systems.

China is also integrating green finance within its "One Belt One Road" strategy, primarily through four institutions: the Asia Infrastructure Investment Bank (statutory capital US $100 billion), the Silk Road Fund (US $40 billion), BRICS Development Bank (statutory capital US $100 billion), and the planned Shanghai Cooperation Organization Development Bank (SCO Development Bank). These institutions are expected to practice green finance principles in their investment decisions, and implement environmental and social risk management measures. The Green Silk Road Private Equity Investment Fund (total size of RMB 30 billion yuan) established in 2015 is the first private equity fund dedicated to investing in One Belt One Road projects, and is similarly expected to adhere to green finance principles.

The figure below presents selected stakeholders in China's green finance reforms.

**Figure 26: China's Green Finance Initiative**




Source: Authors' analysis

**Climate Change and China's War on Pollution**

China's "War on Pollution", prompted by severe air pollution in China's major cities, encompasses responses to pollution of air, land and water. China is attempting to redress its environmental problems with massive investment in cleaner energy and in environmental remediation, making China a leading source of clean energy and environmental investment. China has in the past decade emerged as the leading investor in clean energy technology, accounting for over $78 billion in new investment in renewable energy technologies in 2016, representing almost a third of total global investment (REN21, 2017). The War on Pollution will further increase China's investment in environmental protection measures as China has pledged trillions of yuan of investment to support the policy (Martina et al., 2014).

China's *Air Pollution Control Law* effective January 1, 2016 provides that climate change and air pollution are to be addressed together. Similarly, China's *2014-2015 Action Plan for Energy Conservation, Emissions Reduction and Low Carbon Development* set goals to reduce $CO_2$ emissions per unit of GDP by 4 percent in 2014 and 3.5 percent in 2015. The plan also set goals to reduce the air pollutants sulfur dioxide ($SO_2$), ammonia ($NH_3$), and nitrous oxides ($NO_x$) per unit of GDP by 2, 2, and 5 percent, respectively, each year. However, even within the plan, there is evidence that the two objectives compete with one another. For example, in heavily polluted areas, such as in the Beijing-Tianjin-Hebei region, Yangtze River Delta, and Pearl River Delta, the plan calls for reductions in PM 10 and PM 2.5 air pollutants by 25, 20, and 15 percent, respectively. These are much more ambitious goals than corresponding greenhouse gas reductions for these regions, suggesting greater emphasis on air pollutants, and the potential for conflict among these policies.

Addressing pollution and climate change simultaneously will to some extent create synergies. There is long-standing recognition that a comprehensive and combined program of air pollution and greenhouse gas emission control measures could result in cost savings (Swart et al., 2004). Chinese researchers are working on controlling certain air pollutants together with reducing greenhouse gases. Amann et al. (2008), as part of a program of study conducted by the NDRC's Energy Research Institute and Tsinghua University, developed the Greenhouse Gas – Air Pollution Interactions and Synergies (GAINS) model as a tool to identify emission control strategies. The GAINS model seeks to optimize the reduction of certain air pollutants ($SO_2$, $NO_x$, $NH_3$, particulates (PM), volatile organic pollutants (VOC)) and six greenhouse gases at least cost. Chinese researchers Wang et al. (2010) proposed synergistic control of $N_2O$ and $NO_x$ in the power, vehicle, and nitric acid sectors, as well as synergistic control of $CO_2$, $SO_2$, and $NO_x$ in the power, industrial, vehicle, and residential coal combustion sectors. In 2015, the Ministry of Environmental Protection launched its own research program to coordinate climate change and air pollution efforts (Guo and Liu, 2015).

To the extent that renewable technologies such as wind and solar, fuel switching to natural gas or enhanced energy efficiency measures displace or reduce demand for electricity from coal-fire power generation, these efforts will benefit both climate and anti-pollution goals. These methods can be relatively inexpensive, even cost saving in the case of energy efficiency. Another way in which air pollution and greenhouse reduction goals can be accomplished synergistically is by

targeting air pollutants such as carbon monoxide (CO), VOCs, $NO_x$ and $SO_2$ that are also precursors to greenhouse gases.

Synergies between reducing greenhouse gas emissions and general pollution will eventually be exhausted, however, which could lead to conflict among objectives. Ultimately, higher cost options that lower $CO_2$ emissions and reduce other forms of pollution such as power plant emissions of $SO_2$, $NO_x$, ozone ($O_3$) and mercury will be necessary, as coal will remain part of China' energy mix for decades to come. While China is expected to reduce its overall coal consumption, China alone will continue to account for roughly half of global coal demand, according to the IEA's medium term forecasts through 2021 (IEA, 2016a). This will present difficult choices for policymakers as China's international contributions to reducing climate change and domestic political imperatives to reduce pollution levels will require significantly more expensive technologies. For example, carbon capture and storage (CCS) using pre-combustion gasification technologies such as integrated combine cycle gasification (IGCC) can remove $CO_2$ and other pollutants including $SO_2$, $NO_x$ and mercury efficiently relative to other options, however it remains among the most expensive carbon abatement technologies (Hart and Liu, 2010). China's government would ordinarily only adopt a high-cost technology such as IGCC with CCS if other options are unavailable or inadequate for its goals. Lower cost measures to reduce $CO_2$ are in fact available, however many of these do not reduce other forms of air pollution, such as forestry and agriculture carbon abatement approaches.

Likewise, outfitting power plants with scrubbers to address $SO_2$, $NO_x$, $NH_3$, mercury and particulate emissions do not reduce $CO_2$ (Karplus, 2015), except indirectly to the limited extent that certain pollutants like $SO_2$ and $NO_x$ are also precursors to greenhouse gases. Yet, the use of scrubbers require power plants to generate additional energy to operate them, causing greater coal consumption, and thus increasing $CO_2$ emissions. These measures also increase the overall cost of power plant operations, competing for funds for investment in carbon abatement technologies. Although our discussion has been limited to air pollution, the mandate to reduce pollution of water and soil will similarly compete for investment funds among industries that must reduce emissions across all media.

Cost and limited resources will not only force difficult choices, but they may also result in other un-environmental outcomes. For example, some industries are already moving highly polluting operations to Western regions of China which have lower ambient pollution levels and are subject to relaxed regulatory thresholds for traditional pollutants and $CO_2$ emissions (Martina, 2015). This "solution" to air quality problems will likely lead to increases in greenhouse gas emissions.

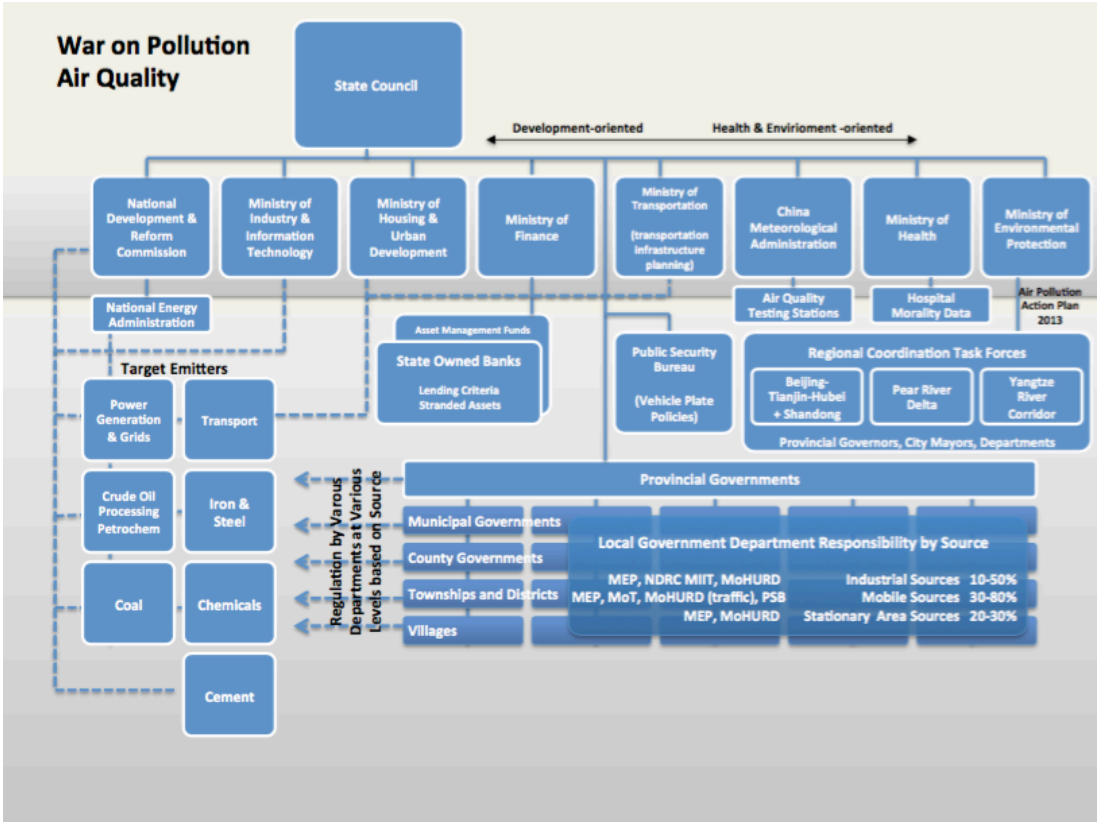
Institutional divisions of authority pose yet another challenge to addressing climate change and pollution together. The most prominent division at the national level is between the NDRC, which is responsible for the regulation and accounting of $CO_2$ emissions as well as for planning of the economy as a whole, and the Ministry of Environmental Protection, which is responsible for regulating traditional forms of air, water and soil pollution. In addition to these agencies, the Ministry of Finance and China's financial regulatory bodies will likely play a role in environmental and climate change policy under China's recent "Green Finance" initiative adopted in the 13th Five-Year Plan, as well as China's ministries governing urban development, transportation and

industry. Although coordination of climate change and air pollution is required by law as noted above, and there are several inter-ministerial bodies described in this report intended to coordinate policy at the national level, there remains limited experience coordinating the actual implementation of policies on the ground among ministries.

Similarly, central government objectives, which encompass public opinion concerning government performance in addressing air pollution, often conflict with the interests of local governments. Local governments tend to be more immediately concerned with attracting industry, generating tax revenues, creating job opportunities, and their own expansion. Thus, there is an ever-present tension between central and local authorities in carrying out environmental policies.

The figure below represents key stakeholders in China's War on Pollution, reflecting divisions both among national ministries, and between national and local governments.

**Figure 27: China's War on Pollution**

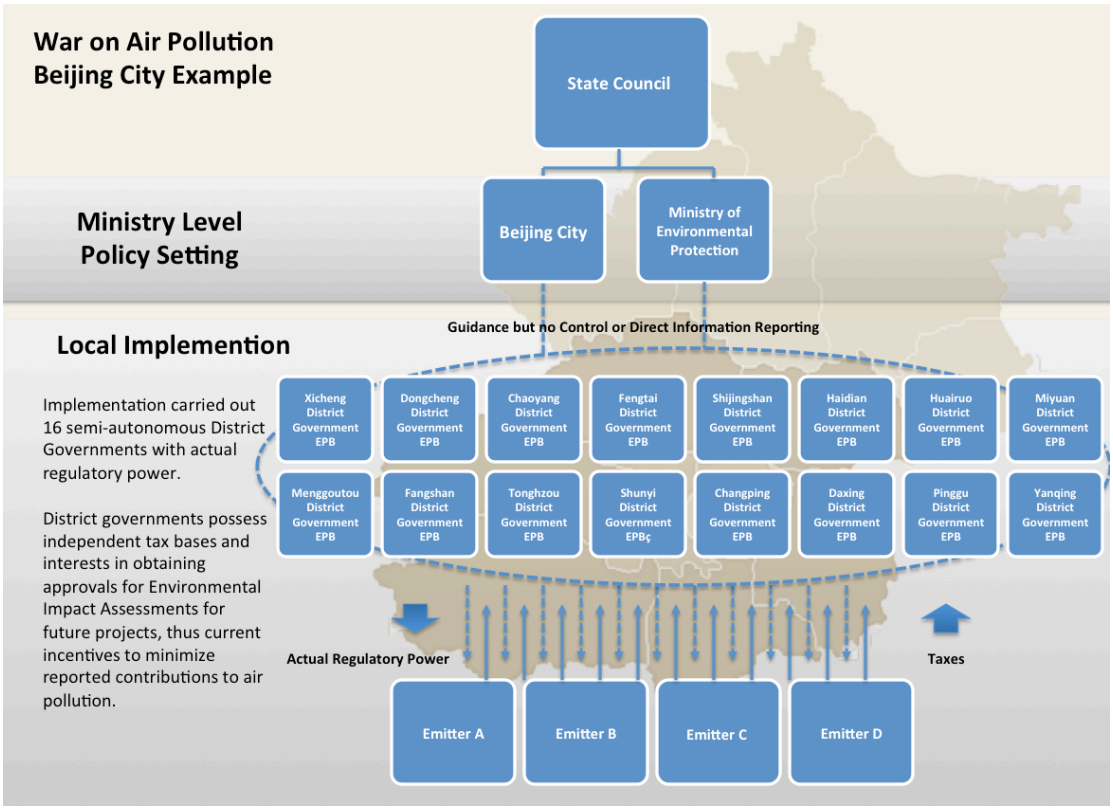



Source: Authors' Analysis

Further complicating matters, similar tensions exist within provincial and municipal governments. Local government agencies representing different regulatory constituents as well as competing municipal subdivisions engage in competition for attracting industry, tax revenues and jobs. The diagram below shows how the city of Bejing's 16 semi-autonomous municipal districts, which

possess independent tax bases, compete with one another to attract industry, creating incentives to weaken environmental enforcement, and to minimize reported contributions to air pollution by emitters in their district in order to obtain approvals for Environmental Impact Assessments for future projects. These incentives undermine cooperation by local government in reporting information accurately, and in enforcing air pollution emissions limits.

**Figure 28: Beijing City - War on Pollution**




Source: Authors' Analysis

In the immediate term, we do not expect significant changes in the current administrative arrangements between the Ministry of Environment and the NDRC as changes would potentially disrupt achievement of current climate change policies and targets. President Xi's September 2015 announcement in Washington, DC that China would establish a national carbon market by 2017 is significant in that it confirmed that the carbon market will be the primary policy measure to achieve the countries targets, as opposed to consideration of a carbon tax, and that the NDRC will continue with its mandate to implement the policy with all due haste.

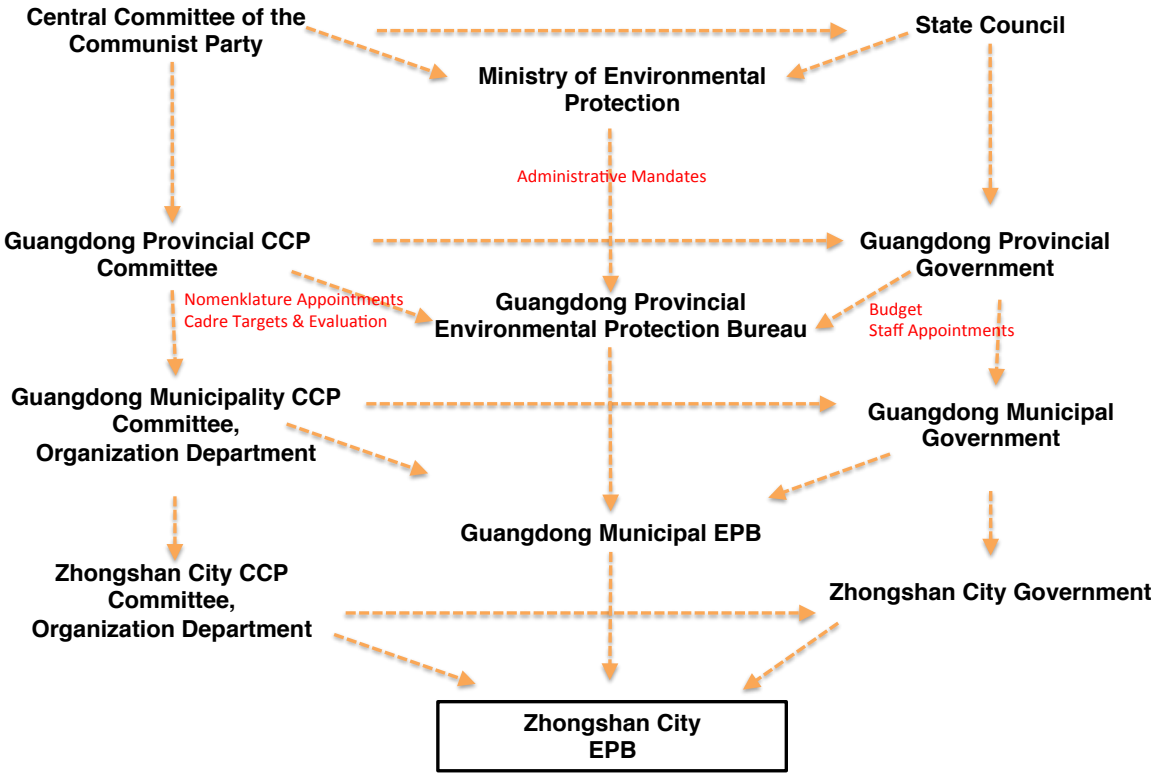
In terms of closer coordination among national level agencies, we believe the prospects for coordination are limited in the near term due to lack of established practice and limited resources. Both the NDRC and the Ministry of Environmental Protection possess modest staffs relative to their responsibilities. The Ministry of Environmental Protection employs some 500 full-time regular professional staff with an annual budget in 2015 of RMB 4.99 billion yuan, and the

NDRC maintains a staff of roughly 900 professionals and a 2015 budget of RMB 1.72 billion yuan.[11] Their relatively small size presents challenges for both agencies to devote staff to coordinate their efforts more closely.

In implementing climate policy, China will face challenges presented by the relationship between the central and local governments. China's unitary government structure features decentralized fiscal budgeting, staffing and implementation authority at the national, provincial and local levels. This frustrates policy coordination by central ministries seeking to influence local actors. To illustrate, the Ministry of Environmental Protection at the national level can only set targets for each of the provincial environmental protection bureaus to meet. A provincial Environmental Protection Bureau is subordinate to the People's Congress of its province, which controls its budget and the appointment of its staff. Further, as described in Chapter 2 of this report, at each level of government a Party committee corresponding to each government agency will appoint certain positions within the government at their level and seek to direct the actions of these cadres through a separate system of Party-determined targets that are used to determine whether individuals will advance for promotion. The figure below illustrates the horizontal and vertical lines of authority.

[11] We note these staff figures do not count those employed in government-affiliated organizations that partially self-fund their operations, such as the NCSC and ERI in the case of the NDRC.

**Figure 29: Horizontal and Vertical Authority within China's Government**




Source: Adapted from Lieberthal (2003).

Competing lines of authority undermine implementation of national environmental protection policies that often conflict with the immediate-term interests of provincial and local government officials seeking to promote economic growth and jobs creation, which in turn facilitates their own career advancement. Efforts to correct local government incentives include introducing enforcement of environmental policies as a criteria used in China's personnel performance evaluation systems (See Article 26, Environmental Protection Law of the People's Republic of China), yet this innovation may be stymied by manipulation of statistics (See, e.g., Wang, 2013), which exacerbates coordination efforts by further reducing transparency.

Importantly, the Politburo's Central Leading Group for Comprehensively Deepening Reforms' *Integrated Reform Plan for Promoting Ecological Progress* (2015) calls for centralization of authority with respect to environmental monitoring and enforcement at the provincial level. This reform would presumably delink county, municipal and township Environmental Protection Bureaus from their corresponding local government counterparts, making them answerable to the provincial Environmental Protection Bureau, and thereby shielding environmental enforcement from local influence. In doing so, it would also strengthen the reach of the Ministry of Environmental Protection by creating a more direct reporting line to all enforcement branches via the provincial bureaus. It remains unclear to what extent budgeting and staffing would remain in the hands of local government authorities, however we expect these must similarly be

centralized if the reform is to work. One of the initial reforms that has followed from the Politburo's directive for institutional reform is that municipal and county water quality monitoring stations shall be moved to provincial control, and river basin management will similarly be transferred to provincial governments. As described earlier in this chapter, the MEP is also moving towards a provincial-based system of permitting for pollution emissions.

One of the central points of China's Energy Revolution is creating an enabling institutional environment for transforming China's energy sector, which would inevitably affect climate policy. These institutional innovations have yet to be announced. The reform model outlined in the *Integrated Reform Plan for Promoting Ecological Progress* (2015) and described above is intended for the environmental portfolio only, and the time frame for its adoption is unclear, however we believe it might serve as an experiment that could be expanded to other ministries and policy areas if successful.

## 9. Climate Policy as Foreign Relations

China's positions in the international climate negotiations have evolved since the negotiation of the Kyoto Protocol and its extension to 2020. During earlier rounds, China's status as a developing country justified its position that its focus should be on development, and that developed countries must take the lead in reducing its greenhouse gas emissions. Now, although it retains its developing country status under the UNFCCC and continues to insist that developed countries must act most aggressively in reducing emissions, China is taking a leading role among global actors in actively reducing its emissions, as reflected in its NDC, which is perhaps the strongest statement to date of China's pledge to the international community of its actions on climate change. Having issued such a comprehensive and strong statement directed at the international community, we expect China will increasingly focus on climate change as a cornerstone of its international relations.

In this chapter, we explore possible reasons why China's negotiation positions have evolved in the Paris Agreement negotiations, considering both the broader driver of international relations and specific climate-related factors.

### China's Foreign Relations Objectives

Both Chinese and foreign academics debate China's objectives and decision-making process in its increasingly active engagements with the international community on global issues. At one extreme, the realist view of state competition argues that China's participation in the international system, like all other great states, is motivated by the pursuit power, wealth and ultimately hegemony (Mearsheimer, 2014: 12-22). A more moderate view contends that shared culture or the erosion thereof determines the viability of the international system, and that the integration of emerging countries into the international order, such as China's adoption of market-based economic principles, is evidence that China is adapting to the core principles of the international system, albeit perhaps selectively (Buzan, 2010), and primarily if not exclusively for utilitarian reasons (Kent, 2007: 242-243). The constructivist school regards China's efforts to integrate in the international system as more thoroughly transformative of China itself, resulting in China ultimately shifting towards a status quo power in the process (Johnston, 2008). A fourth view advanced by Chinese scholars explains China's engagement with the international system is not as a unitary rational actor, but rather is determined by the aggregate of Chinese domestic stakeholders and their myriad sometimes competing interests; yet through the process of China's engagements, it influences the international status quo due to the sheer magnitude of the country's cultural, economic and political importance (Zhang, 2002).

Each of these four competing theories of China's foreign relations offers insight into how China's climate change policy formation process relates to its international objectives. We believe China's climate diplomacy is in the process of migrating from the domestic stakeholder viewpoint towards the realist view, in particular for those aspects of climate change policy of common concern to China's traditional developing country allies. In domestic policy settings, our own cluster analysis is suggestive of the stakeholder view espoused by Chinese academics

explaining state behavior. Yet, we also see evidence of a more unitary approach emerging, consistent with a realist viewpoint, particularly when China's climate change initiatives are championed by China's highest leaders explicitly as an exercise in foreign relations.

China's foreign policy in the climate change area is aimed to secure international recognition of its status as a global power and its role in international governance. China's initiatives in addressing climate change place it on an equal footing in terms of effort with developing countries, and more broadly establishes its role in the international system as an essential party among major powers. China's efforts in climate change are also clearly designed to maintain its role among the G-77 countries, its traditional negotiating alliance in UNFCCC negotiations, as both a leader by example and as a provider of assistance. Moreover, China's climate policies serve to advance a broader economic agenda supporting Chinese companies trading abroad. We believe China's efforts to advance trade within the context of climate actions are probably no different than those of the United States or European Union, however China's specific objectives and how it goes about achieving them are unique and tell us much about China's potential influence internationally in economic, energy, environmental, and climate challenges.

**China's Global Role and Climate Change**

Since it's founding, modern China sought to ally itself with other developing countries that had been liberated from colonialism. Rejecting the then prevailing bi-polar political order dominated by the United States and the former Soviet Union, China set out to define its own role in the international order in what became the "non-alligned movement", an alliance grounded in the common experience China shares with the vast majority of developing countries that had been colonized. In 1954, China's Premier Zhou Enlai enunciated the "Five Principles of Peaceful Coexistence", which would be adopted as the foundation of the non-aligned movement by leaders representing over half the world's population at the Afro-Asian People's Solidarity Conference convened in Bandung, Indonesia the following year (Brautigam 2009: 30):

- Mutual respect for each other's territorial integrity and sovereignty;
- Mutual non-aggression;
- Mutual non-interference in domestic affairs;
- Equality and mutual benefit; and
- Peaceful co-existence.

China would enunciate other principles and policies for foreign aid, and economic and technological cooperation with developing countries, all of which would be based on the Five Principles above.

The Five Principles continue to serve as the foundation of China's foreign policy. As the world's most populous and among the most institutionally capable of the developing countries, China would use these principles to position itself as a leading voice for the concerns of the developing world.

On most issues, China's population and resources have enhanced China's efforts in advocating for the developing world. However, China's own development trajectory and its greenhouse gas emissions threaten to disturb what has been in most other respects a compelling doctrine of

foreign engagement. Since the 2000's, China's emissions began to rapidly increase, transforming its profile from a country emitting roughly the global average per person, to that of a rapidly industrializing economy.

China's economic growth place it among other large or fast-growing non-OECD economies, specifically Brazil, Russia, India, and South Africa, in what are known as the BRICS countries. China together with the other BRICS account for greater than 42 percent of the world's population and almost 33 percent of global GDP as of 2016 (official population statistics of the respective countries except India which relies on unofficial statistics; International Monetary Fund statistics for GDP).

Even among the BRICS, China is the dominant country. China alone accounted for over half of the aggregate GDP of all BRICS countries. Indeed, in 2014, China surpassed the United States as the world's largest economy, accounting alone for roughly 18 percent of global GDP as of 2016. China's economy is two and a half times larger than of India, the next largest BRICS country by GDP and roughly equal in population to China; and between five to 28 times the size of the other individual BRICS economies. China is roughly comparable to these other countries in terms of GDP per capita, yet it remains over twice the size of India even by that metric.

The most important distinction, however, is China's greenhouse gas emissions, both in terms of absolute magnitude and on a per capita basis. When compared to the BRICS countries on a per capita basis, China's 7.1 tonnes per person compares favorably to Russia (11.1 tonnes) and South Africa (8.8 tonnes), while it is almost four times that of India (2.0 tonnes) and almost three times that of Brazil (2.5 tonnes).

When compared to the much broader group of developing countries, however, the differences between China and the rest of the developing world become much more stark. China's emissions of 7.1 tonnes per person are over 40 percent greater than the global average of 5 tonnes per person, and many more times those of the poorest and most vulnerable developing countries. Relative to non-OECD countries excluding China and the other BRICS, China's emissions are 300 percent greater on a per capita basis, and 40 percent greater than all of their emissions combined in absolute terms.

**Table 8: China Compared to BRICS and Other Countries**

| | Population 2016 | GDP US$ 2016 (millions) | GDP per capita | Greenhouse Gas Emissions 2014 | | | |
|---|---|---|---|---|---|---|---|
| | | | | Territorial Basis | | Consumption Basis | |
| | | | | Tonnes $CO_2$/Year | Tonnes $CO_2$/Person | Tonnes $CO_2$/Year | Tonnes $CO_2$/Person |
| China | 1,379,710,000 | 21,269,017 | $15,416 | 9,680 | 7.1 | 8,270 | 6.1 |
| India | 1,330,780,000 | 8,720,514 | $6,553 | 2,597 | 2.0 | 2,125 | 1.7 |
| Brazil | 206,908,000 | 4,299,292 | $20,779 | 507 | 2.5 | 534 | 2.6 |
| Russia | 146,691,020 | 3,750,084 | $25,565 | 1,595 | 11.1 | 1,397 | 9.7 |
| South Africa | 55,908,000 | 735,078 | $13,148 | 476 | 8.8 | 335 | 6.3 |
| | | | | | | | |
| OECD | | | | 12,687 | 10.0 | 14,438 | 11.4 |
| United States | | | | 5,561 | 17.4 | 5,869 | 18.5 |
| European Union (28) | | | | 3,420 | 6.8 | 4,354 | 8.6 |
| | | | | | | | |
| Non-OECD | | | | 21,736 | 3.6 | 19,733 | 3.3 |
| Non-OECD w/o China | | | | 12,056 | 2.6 | 11,463 | 2.5 |
| Non-OECD w/o BRICS | | | | 6,881 | 2.4 | 7,072 | 2.5 |
| Global | | | | 36,240 | 5.0 | | |

Source: International Monetary Fund, World Bank, Global Carbon Project.

Predictably, and in particular from the viewpoint of countries especially vulnerable to climate change, China's rising emissions will have repercussions for China's foreign policy engagement in the United Nations and other international fora. China's development and emissions trajectory potentially put it in conflict with the interests of the vast majority of other developing countries that negotiate under the G77 plus China umbrella at the UNFCCC. As countries increasingly experience the impacts of climate change on their populations and natural resources, particularly water and agriculture, China's contributions to climate change could potentially drive a wedge between China and its traditional developing country partners.

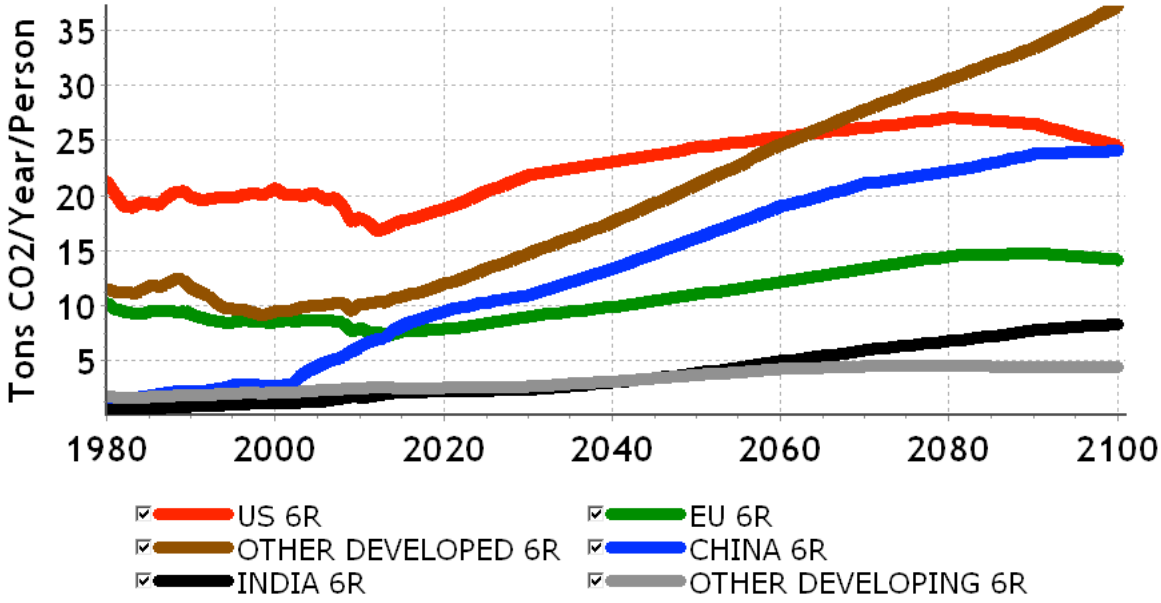
China's emissions profile has already evolved to the point that it is properly compared to fully industrialized countries. In 2008 China surpassed the United States as the world's largest emitter of $CO_2$ on an annual basis. Becoming the world's largest emitter in absolute terms drew heightened attention to China's emissions profile, and China's emissions should weigh heavily with the least developed countries and small island developing states who are most affected by greenhouse gas emissions, regardless of their source.

China has long argued that absolute emissions statistics fail to take China's large population and developing status into account as reflected by its lower historical emissions. However, China's current emissions and future trajectory places it squarely among the European Union and United States as peer countries, even on a per capita or historical basis. China's 7.1 tonnes per person in 2014 already surpasses the European Union's 6.8 tonnes per person, and is rapidly approaching the OECD average of 10 tonnes per person. If China's population stabilizes as is expected, and its emissions continue unchecked, China's emissions will approach 20

tonnes per person by mid-century, placing it firmly at the upper level of developed country emissions on a per capita basis, and significantly in excess of the emissions of numerous OECD countries.

China's rapidly increasing emissions on a per person basis speaks to the extraordinary wealth generation occurring within China and the resulting change in lifestyles, as well as the challenges China faces in addressing inefficiency in its energy complex. It also speaks to the urgent need for China to take aggressive action on climate if it wants to preserve its traditional negotiation alliances as well as protect the global environment. The graphic below shows China's emissions per person already exceeded those of the European Union by the early 2010s and are now gradually approaching and eventually matching those of the United States by end of century based on a business-as-usual scenario. These scenarios attempt to forecast over multiple decades, too long a period to be precise, and represent business-as-usual "no policy" scenarios and thus do not take account Paris Agreement pledges, yet they do provide a strong indication of the projected emissions path China and other countries are presently on without immediate action being taken.

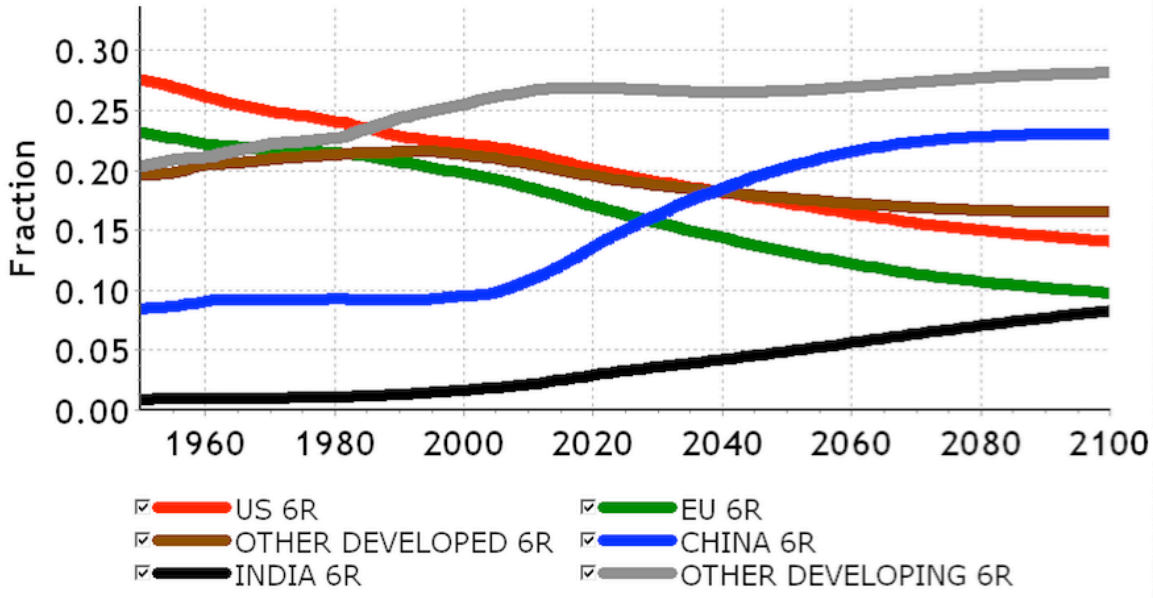
**Figure 30: Per Capita $CO_2$ Emissions for Business-As-Usual Scenario**




Source: C-Roads, 6 Region Reference Scenario (RCP 8.5), February 16, 2017.

Significantly, if China were to continue emissions unabated, China would within the next twenty years become the largest cumulative emitter of the industrial era. Such a possibility undermines historical arguments that the western world is primarily responsible for global greenhouse gas emissions. Thus, as shown in the graphic below, at China's current rate of $CO_2$ emissions growth, by 2040 China will have surpassed all other countries in $CO_2$ emissions since 1900. Because China already accounts for over 30 percent of global emissions annually, twice that of United States, this outcome is practically inevitable.

**Figure 31: Cumulative $CO_2$ Fossil Fuel Emissions for Business-As-Usual Scenario**




Source: C-Roads, 6 Region Reference Scenario (RCP 8.5), February 16, 2017.

Given that countries negotiate the terms of future climate agreements in cycles of five to ten years in advance, negotiators necessarily consider current and near-term future emissions profiles. Thus, in light of forecasts of China's emissions on a business-as-usual basis, China's ability to preserve the arguments that responsibility lies primarily with the developed world for damage to the climate greatly depends on its taking aggressive action before its own emissions profile becomes comparable with its primary competitors in climate negotiations – the United States and European Union. China's changing emissions profile has implications for the way China's negotiates with other countries in the UNFCCC, and its contribution to overall climate impacts could well impact traditional foreign policy alliances beyond the climate negotiations.

Given China's changing emissions profile, Chinese government officials and academics both within and outside China have argued that as a producer of products for the rest of the world, China's territorial emissions overstate its actual emissions. A more appropriate measure would be based on national consumption. This argument of last resort requires changing the commonly accepted accounting approach upon which global emissions have been calculated, and would do nothing to solve the actual problem. Because it does nothing to address climate change, developing countries most at risk by climate change are likely to find it unpersuasive. The argument is also flawed on methodological or substantive grounds in at least two other respects. China is an enormously large importer of raw materials, many of which have significant environmental impacts that are not accounted for in China's own emissions profile. For example, China's demand for raw resources has been cited as a key driver for deforestation and planting of palm oil and biofuel crops in Southeast Asia (World Watch Institute, 2017). The activities of Chinese companies have raised concerns over their treatment of the local environment in Africa, the impacts of which are externalized to local communities (See

Brautigam 2009). China's demand for meat and soy products is contributing to fueling the destruction and degradation of the Amazonian rain forest, helping push it to a tipping point beyond which the planet could lose its single most important terrestrial carbon sink and the supplier of rainwater to both the South American and African continents (Brown, 2009). For example, China alone is estimated to have accounted for over 40 percent of emissions embodied in Brazilian soybean exports in 2010 (Karstensen et al., 2013). If China's emissions were accounted for on a consumption basis, and if such calculation was performed on a life cycle basis across global supply chains for raw resources and other inputs, the results would require China to account for a portion of foreign emissions associated with its own needs and activities. The second problem with this argument is that China is itself a large consumer, and the government is attempting to increase consumption in order to stabilize its own economy and shield it from external risks associated with an export-dependent economy. Even presently, a change in account would not significantly change China's overall absolute or per capita emissions. As shown in the table above, China's overall emissions would reduce 15 percent, and its per capita emissions would only decline from 7.1 to 6.1 tonnes. Even on this basis China's emissions are still considerably higher than non-BRICS non-OECD countries, and will continue to grow due to China's rapidly increasing consumption trajectory. Thus, at best, this argument serves to delay what must be done to prevent dangerous climate change, and now there is no time for delay.

The OECD, China and other countries must all reduce their emissions by at least 85 percent or greater by mid-century to prevent dangerous climate change. Because China accounts for a third of global emissions, China reducing its emissions is essential if we are to meet these goals. Whatever equitable arguments may have applied in the past, the equities now clearly support the positions of the most vulnerable countries - the least developed countries and small island developing states - that must see action by all major emitters including China if they are to have the opportunity to continue to develop or, in the case of many of the most vulnerable, survive.

**China's Bilateral Climate Agreements and Trade**

There is ample evidence that the Xi-Li Administration is adopting climate change as a major platform on which to advance its foreign policy agenda for China to assume a leading role in international governance. In essence, the Chinese government is transforming a potential liability to a political advantage. President Xi and Premier Li have made several important public statements on climate change, emphasizing it is a priority for China. China's foreign relations policy statements on climate change in preparation for the negotiation of the Paris Agreement at COP 21 (30 November - 11 December 2015) included:

- In June 2014 in London, China and the United Kingdom issued a joint climate change statement pledging to intensify their bilateral policy dialogue and undertake practical collaboration through the China-UK Working Group on Climate Change.

- President Xi Jinping's September 2014 visit to India to promote China-India bilateral cooperation resulted in the *Joint Statement between the Republic of India and the People's Republic of China on Building a Closer Developmental Partnership*. It states "The two sides believe that the 21st century should be marked by peace, security,

development and cooperation. As developing countries, India and China have common interests on several issues of global importance like climate change, Doha Development Round of WTO, energy and food security, reform of the international financial institutions and global governance…" (Joint Statement, Paragraph 21).

- In October 2014, Premier Li Keqiang and Germany's Chancellor Merkel signed the *Action Framework for German-Chinese Cooperation on Shaping Innovation Together*.

- President Xi's November 2014 reception of President Obama in Beijing during which the two leaders announced the *U.S.-China Climate Change Accord* which calls for cooperation across a wide range of technologies including energy-efficient buildings, smart grid, electric vehicles, carbon capture and storage (CCS) and other technologies (The White House, 2014).

- China's announcement during the COP 20 meetings in December 2014 in Lima that China will establish its own bilateral South-South climate fund.

- At Premier Li's May 2015 summit with Prime Minister Modi in Beijing, the two countries issued the *Joint Statement on Climate Change between the Government of the Republic of India and the Government of the People's Republic of China*, promoting bilateral partnership on climate change, reaffirming their commitment to engage through the UNFCCC process, and further strengthening practical bilateral cooperation, including in areas of clean energy technologies, energy conservation, energy efficiency, renewable energy, sustainable transportation including electric vehicles, low-carbon urbanization and adaptation.

- In May 2015 in Brasilia, China and Brazil issued a *Joint Statement on Climate Change* between the two governments recognizing the importance of their cooperation and coordination on climate change in the context of the China-Brazil Global Strategic Partnership and through the China-Brazil High Level Coordination and Cooperation Committee, in such areas as renewable energy, forest sinks, energy conservation, energy efficiency, adaptation, and low-carbon utilization.

- In June 2015 in Brussels, China and the European Union issued the *EU-China Joint Statement on Climate Change*, in which both parties agreed to cooperate on developing a cost-effective low-carbon economy while maintaining robust economic growth, intensify bilateral and multilateral dialogue, and continue to undertake cooperation across various technologies and measures.

- On 30 June 2015, the same day China submitted its *Enhanced Actions on Climate Change China's Intended Nationally Determined Contributions*, Premier Li met with the President of France in Paris where he emphasized that China appreciates and supports the efforts of France to host the Climate Change Conference in Paris (COP 21), and will promote a positive outcome at the conference.

- President Xi's September 2015 visit to the United States where he announced China will establish a national carbon emissions trading system by 2017, and committed $3.1

billion to establish a bilateral South-South climate fund to help developing countries combat climate change.

- In September 2015, President Xi attended the Leaders Working Lunch on Climate Change of the United Nations in New York, where he pledged that China will seek to further intensify control over its greenhouse gas emissions and try to achieve the target of reducing carbon intensity by 40 to 45 percent in 2020. President Xi also stressed that China is willing to continue taking international responsibilities consistent with its own national conditions, development stage and capability, and China is willing to cooperate with countries around the world to deal with climate change in the process of implementing its development agenda.

- In November 2015, President Xi hosted President Hollande of France in Beijing where both countries pledged to cooperate on technology development and transfer to support solutions to climate mitigation and adaptation, support countries vulnerable to climate change in their adaptation efforts, and, importantly, stated that country NDCs should be reviewed every five years and the evaluation of country efforts should be transparent.

Significantly, the bilateral climate declarations between China and each of Brazil, the European Union, Germany, India, the United Kingdom and the United States all promote cooperation to secure co-benefits of actions on climate, principally investment and trade opportunities, and technology development. For example, China's Joint Statement with Brazil pledges "to foster cooperation and enhance their knowledge on photovoltaic panels and cells industry and explore business opportunities in this area, including mutual exchange of policy, planning, technology and standards, testing and certification and personnel training, and to promote investment projects and the establishment of related production facilities in Brazil by solar energy enterprises from China." This strongly suggests that climate change will be an important vehicle for China's diplomats to advance commercial interests as well as environmental goals. Moreover, we believe that China's bilateral agreements will be especially important for commercial diplomacy because China may be unwilling to seek to be a recipient of assistance of any kind under UNFCCC institutions as it seeks to establish its role as a "donor" country through its recent commitments. To accept UNFCCC assistance would put China in competition for resources with other developing countries it is otherwise seeking to assist. In contrast, seeking commercial opportunities through bilateral agreements do not pose any such conflict.

**China's Institution Building**

Climate change and climate finance provides China with a platform on which to expand its efforts to build international institutions. From China's gradual yet remarkable evolution from isolation to active engagement with the international community, China's efforts to reshape the international order have reached a milestone in that it no longer merely participates in international organizations, it is establishing new ones.

In the mid-2010s, China established the Silk Road Fund, a state-owned investment fund of the Chinese government, and led the international community in establishing the Asian Infrastructure Investment Bank (AIIB), both based in Beijing. The Silk Road Fund is dedicated to supporting China's One Belt, One Road policy announced in 2013, the stated goal of which is to

promote the economic prosperity of Asian countries along the land and maritime routes comprising the ancient Silk Road. The strategy is seen as essential to securing China's supply of energy, ensuring geopolitical stability along its borders, and supporting its domestic economy by redeploying excess capacity to broader Asia and beyond to support development. Reminiscent of Japan's Greater East Asia Co-Prosperity Sphere, the strategy signals China's intentions to play an expanded role in Eurasia.

China's multilateral institution building efforts are undoubtedly one of the most important developments in its engagement with the international community. Climate and development themes play an especially important role in these efforts. China led a group of over 50 founding countries in establishing the AIIB, a multilateral bank that will focus on supporting infrastructure development in the Asia-Pacific region. Based in Beijing, the AIIB will conduct projects in various infrastructure fields including energy and power, transportation and telecommunications, rural infrastructure and agricultural development, water supply and sanitation, environmental protection, urban development and logistics (AIIB, 2017). Although the AIIB will be governed by an international board comprised of its government shareholders, its achievement represents the maturation of China's foreign policy in securing its role in international governance, as well as shifting the balance of influence by establishing alternative institutions in which its voting privileges, control over agendas and implementation are commensurate with China's stature in the global economy.

China similarly has supported new groupings of countries linked to climate, development and other foreign policy areas. The BRICS group comprised of China and the other large and rapidly developing countries of Brazil, Russia, India and South Africa, established its own development bank, the BRICS New Development Bank based in Shanghai. The BRICS Contingency Reserve Arrangement and the Chiang Mai Initiative Multilateralization, both established in 2014, offer crisis liquidity to their members, as an alternative to the International Monetary Fund. In the area of defense, China sponsors the Shanghai Cooperation Council that acts as a forum for convening discussions on political, economic and military matters among Eurasian countries. China is also increasing its participation in the Conference on Interaction and Confidence-Building Measures in Asia, whose membership is more broadly inclusive across Asia, as a possible platform for advancing the One Belt, One Road strategy and other policy initiatives (Heilmann et al., 2014).

The BRICS New Development Bank, Silk Road Fund and the AIIB expand upon China's long-standing practice of providing an alternative to the western development model exemplified by the Bretton Woods system, which China itself joined in the 1980. Unlike the World Bank (focusing on development) and the International Monetary Fund (focusing on monetary and macroeconomic policy), which condition the provision of financial support on meeting project-specific social and environmental safeguards and embracing liberal economic policies, China's own bilateral assistance to other countries imposes no such conditions. China and other recipients of World Bank and IMF support commonly regard their conditions to lending and assistance as interference motivated by political objectives. Thus, China's support emphasizing investment in infrastructure without such conditions is particularly attractive to developing countries.

Although Chinese aid traditionally carries fewer conditions than assistance from other donors, China imposes one requirement - recipients must accept the One-China principle and withdraw recognition of Taiwan. Thus, while imposing no conditions having much impact on recipients, China's aid policies have profound geo-political ramifications. China's bilateral aid policies allegedly are used today to secure votes among developing countries in the United Nations General Assembly, and to keep China firmly embedded within the over 130 G-77 countries in international negotiations. During the 2010 to 2012 period, China provided general assistance to 121 countries, including 30 in Asia, 51 in Africa, 9 in Oceania, 19 in Latin America and the Caribbean and 12 in Europe (China Daily, 2014). For example, China provides aid to every single sub-Saharan African country that accepts the One-China policy (Brautigam 2009: 278), a key block of countries critical to China in the United Nations.

**China's South-South Climate Initiatives**

The NDRC has been designated as China's lead agency for South-South cooperation with respect to climate change. China's climate assistance builds on its broader foreign assistance programs described above. The NDRC has established cooperation on climate change with over 40 developing countries as of 2013, and has signed Memorandums of Understanding to Provide Foreign Aid to Address Climate Change with roughly thirty developing countries (China's Policies and Action for Addressing Climate Change 2013, 2014 and 2015). At the end of 2016, China announced the launch of its South-South Climate Cooperation Fund with funding of RMB 20 billion yuan, and launched the Ten, Hundred, Thousand Project, launching 10 low-carbon demonstration zones, 100 mitigation and adaptation projects, and cooperation projects providing 1,000 people training in developing countries (China's Policies and Action for Addressing Climate Change 2016).

China's evolution of leadership is especially significant for its engagement in South-South cooperative as a donor country assisting G-77 members with mitigation and adaptation efforts. In November 2015, China's Special Climate Change Envoy and lead negotiator Xie Zhenhua emphasized China's focus on assisting other developing countries in stating, "Climate change adaptation will be at the center of our future cooperation with other developing nations." Priorities include strengthening developing countries' early warning systems to enable them to prevent natural disasters and cope with extreme weather events (Liu, 2015).

China's bilateral South-South climate fund is perhaps the most concrete example of how China is engaging climate change issues beyond its borders and redefining the way in which China relates to and helps its developing country partners in the process. How specific countries and projects will be chosen to receive funding, the extent to which bilateral funding adheres to international safeguards for social and environmental impacts, and whether China will seek to achieve subsidiary objectives such as promoting Chinese companies as solutions providers (as already reflected in China's bilateral climate cooperation agreements descried above), will shape the specific nature of China's climate diplomacy.

Government to government assistance to other developing countries is only one way China is seeking to expand its influence abroad. China has long been a leading investor in developing countries, particularly in Africa. As noted above, China's leadership in establishing the AIIB based in Beijing institutionalizes its role in development assistance on a multi-lateral basis.

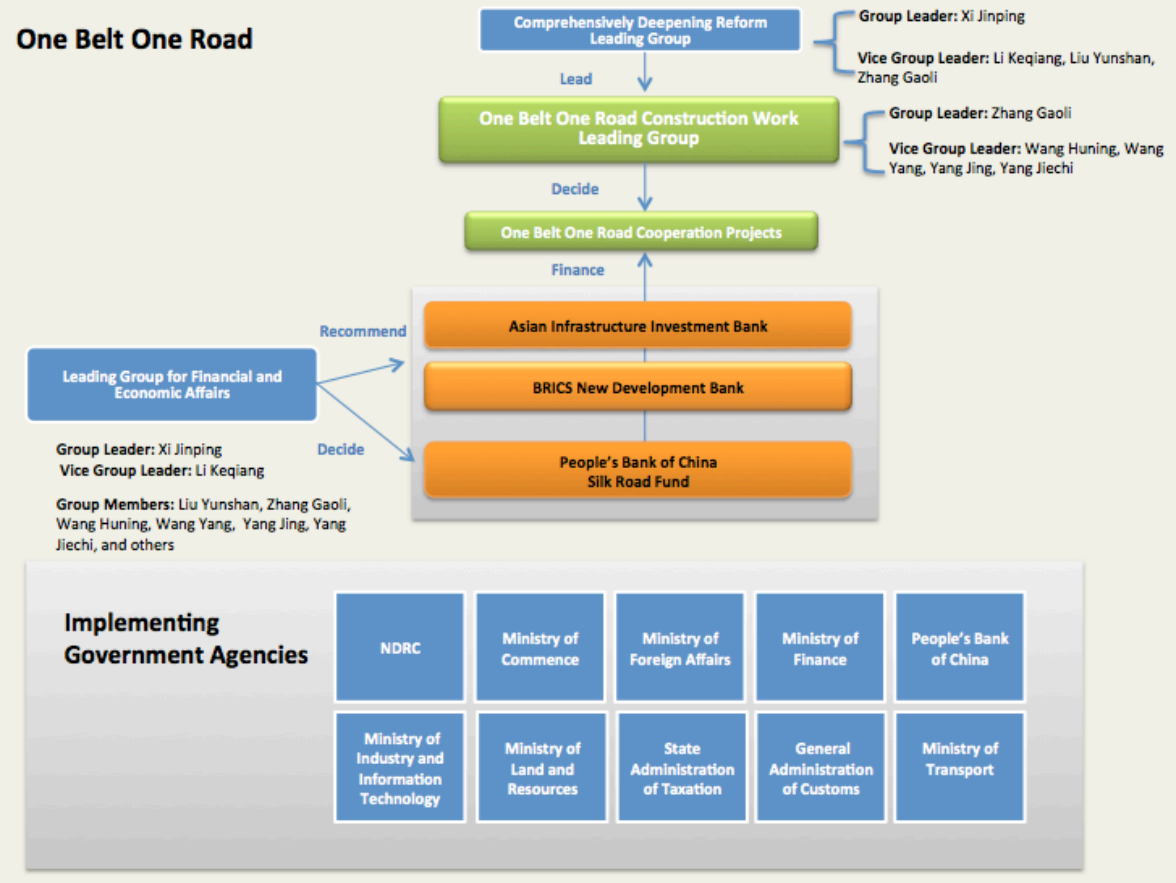
Further, China's Ministry of Science and Technology has established a South-South cooperation center through which Chinese enterprises assist other developing countries by facilitating their adoption of low-carbon emissions technology in collaborative relationships, thereby mobilizing China's commercial sector resources in international climate efforts.

We see climate change more fully integrating with China's broader foreign policy engagements with respect to G-77 countries that are the core of its climate negotiations alliance, especially in the context of China's One Belt, One Road strategy. China's *One Belt, One Road* policy, announced by President Xi when he visited Central Asia and Southeast Asia in September and October 2013, respectively, is intended to help promote the economic prosperity of Asian countries along the land and maritime routes comprising the Silk Road over which China has conducted commerce since ancient times, and signals China's intentions to play an expanded role in Eurasia. The policy is seen as essential to securing China's supply of energy as well as ensuring geopolitical stability along its borders. It will strengthen China's own economy by fostering trade and redeploying China's excess capacity in infrastructure and other industries to support broader Asian development.

According to the *Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road* issued in March 2015, the *One Belt, One Road* strategy contemplates joint actions on climate change. According to the document, “We should promote ecological progress in conducting investment and trade, increase cooperation in conserving the eco-environment, protect biodiversity, tackle climate change, and join hands to make the Silk Road an Environment-friendly one.” More specifically, “efforts should be made to promote green and low-carbon infrastructure construction and operation management, taking into full account the impact of climate change."

In order to better realize the *One Belt, One Road* strategy, Chinese policy documents call for both China's Silk Road Fund and the multilateral AIIB to integrate climate themes in their work programs. According to the AIIB's website, its "modus operandi will be lean, clean and green" and it is an institution "built on respect for the environment." The AIIB will conduct projects in various infrastructure fields including energy and power, transportation and telecommunications, rural infrastructure and agricultural development, water supply and sanitation, environmental protection, urban development and logistics (AIIB, 2017). As the two financial institutions are still in their formative stages, how they will address environmental issues in general and climate change in particular is not yet clear. The diagram below, which was adapted from Chinese government policy documents, illustrates how the AIIB, BRICS New Development Bank, Silk Road Fund, and the efforts of various government ministries are expected to support China's One Belt, One Road strategy.

**Figure 32: China's One Belt, One Road Policy**




Source: Government of the People's Republic of China

## 10. Future Directions

In this concluding chapter we look to the future of China's climate policy formation process. We consider how China's climate policies might influence its own future. We evaluate how China's climate policies may evolve and influence China's broader reform agenda in both the environmental field and the economy generally, how achieving China's NDC will involve challenges in gaining cooperation at the local level, and how China's climate diplomacy is emerging as a tool of foreign relations.

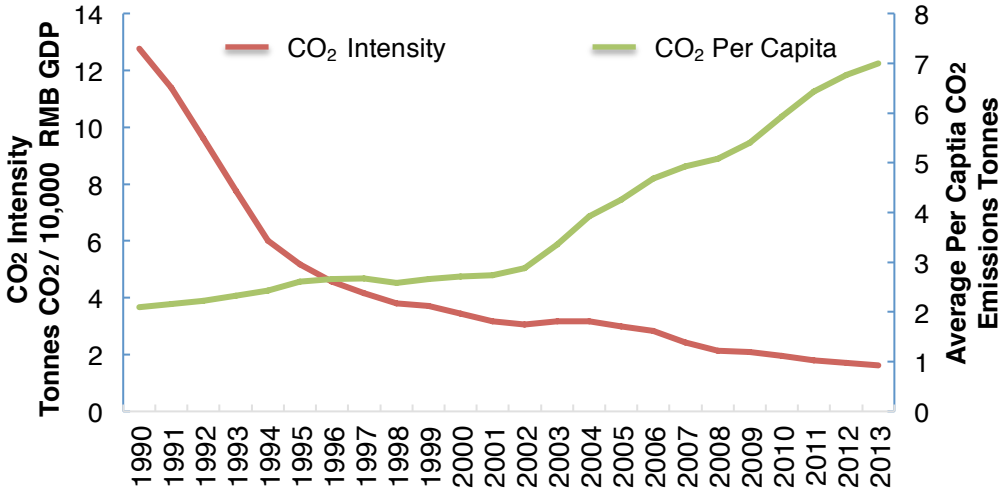
### Climate and Environmental Policies Leading Broader Reform Agenda

Since its founding in 1949, China's central government has relied on command-and-control measures to direct the country's development. Implemented through a series of five-year plans, for the first three decades China's policies focused on reorganization of the economy under centrally controlled state-owned enterprises. With the government and market reforms instituted by Deng Xiaoping starting in 1978, the central government began introducing markets as a feature of the economy, and has in the last several years stepped up its efforts to "marketize" the economy.

Until recently, China's climate change and environmental protection policies generally have reflected the traditional command-and-control pattern of regulation that was the foundation of economic and political organization. Pollution control policies such as forcing the closure of small, highly polluting and inefficient coal-fired power plants and manufacturing facilities as occurred during the 11th and 12th Five-Year Plan cycles are examples of this approach to policy. These policies have been highly effective to a point. However, as with China's broader approach to national development, the government has recognized the inherent limits in command-and-control policies both in terms of cost to the economy and results in reducing $CO_2$, and the need to expand its arsenal of policy options by embracing market-based approaches to help solve the country's environmental problems (Hart et al., 2015). As shown in the figure below, China's reductions in its carbon intensity, which sharply decreased in the 1990s, started to level off in the past decade as China's emissions per person continue to rise, necessitating new policy approaches.

China's environmental policymakers are now at the beginning of regulating greenhouse gas emissions and pollution of air, water and land through market signals. Market-based measures represent a new breed of policy for China. Market-based policies are premised on the principle that one must internalize the cost of pollution and thereby provide an incentive to reduce emissions. These policies operate by increasing the costs of operation for polluters, or by generating revenue for those that produce environmentally superior products or those who produce products more efficiently and with less pollution.

**Figure 33: China's $CO_2$ Intensity and Per Capita Emissions**




Source: National Bureau of Statistics.

The movement towards market-based approaches was strengthened in 2011 when China issued the 12th Five-year Plan (2011-2015) and China's State Council issued the *Decision to Strengthen Priority Work of Environmental Protection* and reiterated its policy to establish environmental markets as a means to achieve environmental goals. Since then, China has embarked on a reform agenda embracing market-based approaches in the climate and environmental field, which include:

- Pilot greenhouse gas emissions trading markets followed by a national market in 2017;
- Environmental taxes such as resource taxes, pollution emissions fees, fuel tax, vehicle and vessel sales and operating taxes;
- Green credit systems by which banks and other financial institutions reflect sustainability in their lending criteria; and
- Green consumption policies such as energy efficiency and sustainability labeling through which ordinary consumers can exert influence through purchasing decisions.

We believe that for China to be successful with its market-based climate and environmental policies, embracing market principles in the operation of its economy more broadly is essential. Market-based environmental policies do not operate in a vacuum, unaffected by the larger economy. For market-based environmental policies to work most effectively, the broader economy must allocate capital, raw materials and labor based on market signals. Moreover, we believe market-based environmental policies could speed the adoption of market principles throughout the economy. A fuller discussion of China's adoption of market-based approaches to climate and environmental policy is available in Hart, Ma, Ying and Zhu (2015).

**China's NDC from Central Planning to Local Implementation**

We believe China has initiated a long-term transition toward greater centralization over environmental policy in general and climate change in particular. This is publicly evidenced by President Xi and Premier Li's personal participation in leadership summits focusing on climate change and announcing China's War on Pollution. The personal involvement of China's top leaders signals their commitment to these programs and ensures that efforts to achieve environmental goals will be directed by the center.

At the same time, China's central government relies upon provincial and ultimately local government to execute laws, regulation and policies. While the central government sets general policy, provides funding and creates incentive systems to influence the behavior of emitters, the vast majority of China's greenhouse emissions are generated by industry, households and government sectors regulated at the provincial and local government levels. Thus, cooperation of industry and local government will be essential to carrying out the policies and measures outlined by the central government in China's NDC.

As described previously, in practice, provincial and local government have resisted higher regulatory standards imposed by the center in order to attract investment and protect local economic interests. This central-local dynamic, which has played out in various policy fields including environmental protection, suggests that the implementation of China's NDC targets and actions will require the central government to focus its attention on implementation at the local level. Historically, coordination between the central and local governments has not been strong in the environmental field, resulting in the current environmental crisis.

Overcoming local resistance will require setting targets that take into account local conditions and the concerns of local stakeholders in the planning process. As cost is likely to be a primary concern among key industry stakeholders, soliciting buy-in by provincial authorities and enterprises will require financial arrangements between the central and local governments capable of ensuring support. Financial incentives must also be backed by credible emissions monitoring, reporting and verification systems, and robust enforcement in cases of non-compliance.

With China's top political leaders personally committing the nation to take action on climate change and international oversight of China's national contributions through a UNFCCC pledge and review mechanism, ensuring success requires that the central government engage effectively with local government and stakeholders. This challenge will test China's fundamental governance institutions.

**Climate Change as a Platform for Expanding China's Foreign Policy Influence**

China has deftly transformed a political liability in its rapidly rising greenhouse gas emissions into a vehicle for expansion of its foreign policy centered on climate diplomacy. In doing so, China has positioned itself simultaneously as a leader among developing countries and a rising great power. China's leadership in climate focuses heavily on South-South cooperation, which solidifies its ties to the G77 and aligns itself with rapidly growing developing economies, thereby enhancing both the political and economic value of its climate leadership. Under China's One

Belt, One Road strategy, China is engaging developing countries through government-to-government, commercial, and multilateral institutions, principally the AIIB and the BRICS New Development Bank, to pursue both climate-related and economic objectives abroad.

Thus, climate has emerged as a new platform for global competition. China is mastering this opportunity by bolstering its efforts to develop international institutions and to assert itself in global environmental governance, potentially reordering international leadership in climate and beyond in the process.

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**Key Policy Documents Relating to Climate Change**

| Year | Lead Agency | Document |
|---|---|---|
| 2006.02 | State Council | *National Program for Long- and Medium-Term Scientific and Technological Development to build an innovation-oriented country 2006-2020* |
| 2007.06 | State Council | *National Climate Change Program* |
| 2007.06 | MOST | *China's Scientific and Technological Actions On Climate Change* |
| 2011.09 | State Council | *Comprehensive Work Plan for Energy Conservation and Emission Reduction During the 12th Five-Year Plan Period* |
| 2011.12 | State Council | *Work Plan for Controlling Greenhouse Gas Emissions During the 12th Five-Year Plan Period* |
| 2012.06 | NDRC | *Interim Regulation of Voluntary Greenhouse Gas Emission Trading* |
| 2017.04 | MOST<br>NDRC | *National Scientific and Technological Actions on Climate Change During the 13th Five-Year Plan Period* |
| 2013.05 | NDRC<br>National Bureau of Statistics | *Opinion on Improving Response to Climate Change and Statistical Work for Greenhouse Gas Emissions* |
| 2013.09 | State Council | *Action Plan for Air Pollution Control* |
| 2013.12 | NDRC | *National Strategy for Climate Change Adaption* |
| 2014.05 | State Council | *2014-2015 Action Plan for Energy Conservation, Emissions Reduction and Low Carbon Development* |
| 2014.09 | State Council | *National Plan on Climate Change for 2014-2020* |
| 2015.04 | CPC Central Committee<br>State Council | *Opinion on Further Promoting the Development of Ecological Civilization* |
| 2015.06 | NDRC | *Enhanced Actions on Climate Change: China's Intended Nationally Determined Contributions* |
| 2015.09 | CPC Central Committee<br>State Council | *Integrated Reform Plan for Promoting Ecological Progress* |
| 2015.11 | NDRC | *China's Policies and Actions on Climate Change* |