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Mapping China's Climate Policy Formation Process

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China Carbon Forum
中国碳论坛

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

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Executive Summary and Foreword

In the past year since we published the first version of *Mapping China's Climate Policy Formation Process*, China has assumed a proactive posture in the international climate negotiations through advancing its positions through multilateral and bilateral diplomacy, its ongoing efforts to reduce its greenhouse gas emissions and adapt to climate change, and its pledges of future action. 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.

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 the stakeholders and how they engage with one another, as opposed to focusing on substantive policy issues. The stakeholders involved in the formation of climate policies vary based on the underlying substantive issues and choice of technology. Thus, we consider substantive policy to the extent necessary to identify stakeholders.

In this second edition of *Mapping China's Climate Policy Formation Process*, we expand and update our analysis in several aspects. We add a chapter describing the Communist Party's relationship to the government and Party institutions involved in setting policy for climate change. We update our analysis to reflect China's June 2015 submission to the UNFCCC of its intended nationally determined contribution (INDC) *Enhanced Actions on Climate Change*. We examine the process by which China's INDC was developed, its relationship to other policy formation processes such as China's five-year planning process, and how it may influence the broader climate policy formation process both at the national and local government levels. We evaluate the relationship between China's greenhouse gas emissions reduction goals in the context of its efforts to improve air quality as part of China's War on Pollution, and potential synergies and conflicts between the two objectives based on economic, technological and institutional considerations. Our expanded analysis looks to the future to evaluate how China’s climate policies and recently issued INDC may evolve and influence the broader formation of environmental policy and enforcement in China.

We believe that China's climate policies are developed based on a 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), which has formal responsibility for leading and coordinating China's international climate negotiations efforts. The NDRC exerts tremendous political power both through its role leading the negotiations and through its broad responsibilities for China's economic development. The most 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 climate mitigation, adaptation, technology transfer, and finance - as

well as broader foreign policy issues. 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 Chinese leaders in the government and the Party suggest that climate policy is emerging 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 strongly suggest 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 higher profile political decision making led by the Party and government officials at the highest level. 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.

This report confines its analysis to domestic Chinese organizations of the Communist Party of China, the government, state-owned industry and expert organizations. In evaluating China's climate policy formation process, we do not consider foreign organizations such as governments, NGOs or intergovernmental organizations such as the World Bank Group or the Asian Development Bank. While we believe these organizations play an important role in the provision of information and financial and technical support for projects and policies, they remain outside the scope of our study. Notably, we also do not analyze domestic Chinese NGOs. We see persuasive evidence that NGOs as a group are playing a significant role in supporting the development of policy and shaping news and opinion, however we did not seek to distinguish which particular organizations influence policy.

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 individuals outside our team who are knowledgeable about the international climate negotiations and China's climate policies to confirm information and develop our findings.

The report is organized in eight sections. First, we provide 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. Part two summarizes key Party organizations and leadership task forces engaged in climate and environmental policy. It explains how the Party leads government policy processes. In part three, 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. Part four focuses on expert organizations and part five on industry stakeholders. In part six, we present our understanding of different climate policy formation

"clusters" around specific issues. Part seven evaluates the process by which China's INDC was developed and its relationship to China's five-year planning process. 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. The report 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 INDC to achieve its pledges to the international community.

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Note

The views expressed in this report are those of the authors and do not necessarily represent those of the Governments of Norway or 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, all of whom are nominally elected or approved by the **National People's Congress**. 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 Nationals 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 Election Law of People's Congresses. 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, 2015). 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 is responsible for regulating greenhouse gas emissions from rice and livestock, and is involved in adaptation policy issues.

Ministry of Water Resources is responsible for managing water resources in China.

Ministry of Housing and Urban Rural Development is responsible for managing sustainable urbanization. The Ministry plays an important role in eco-city and green technology development.

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, 2015). 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.

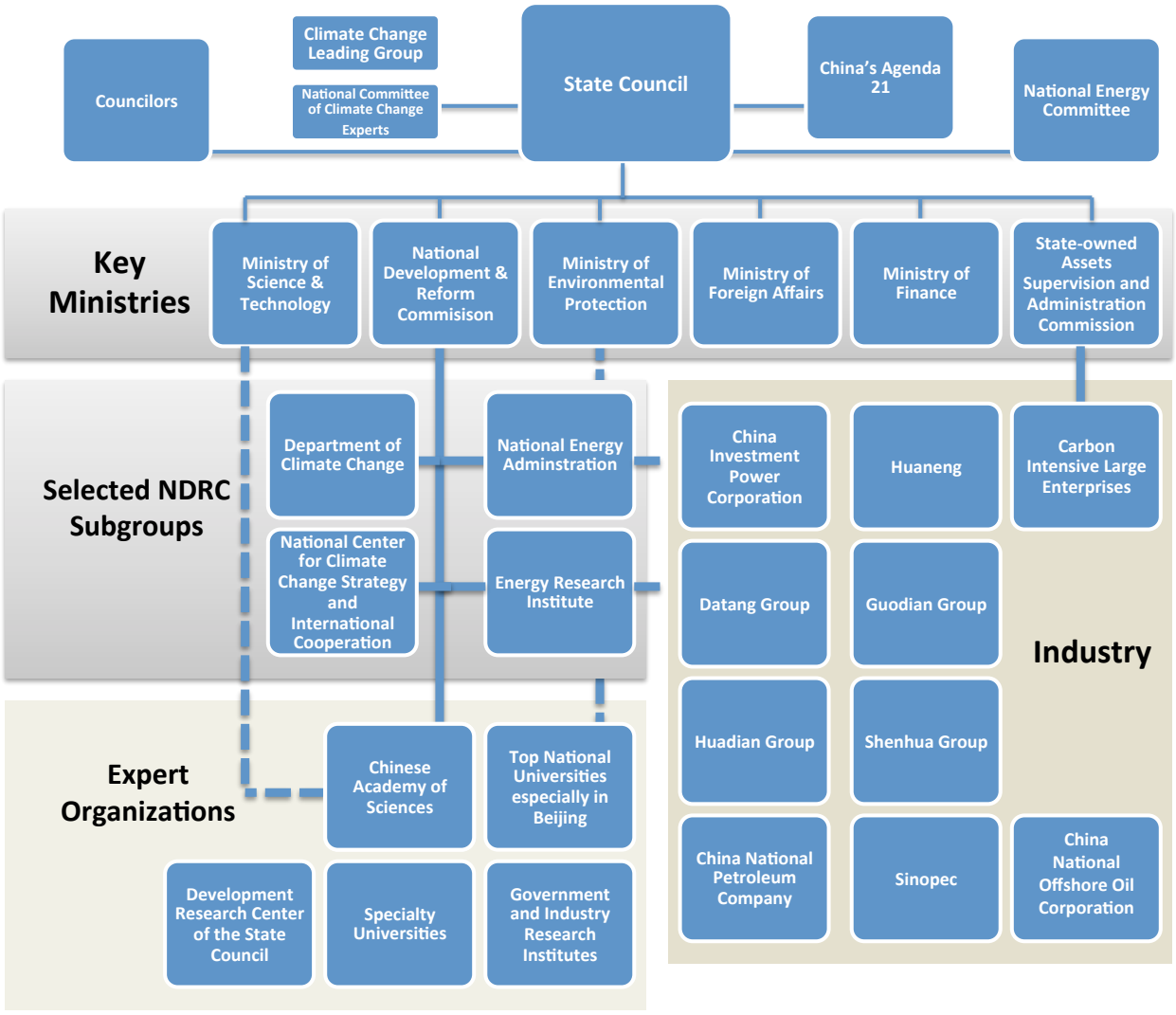
National Bureau of Statistics is responsible for compiling, processing and publishing China's official statistics, including those relating to economic activity and greenhouse gas emissions.

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 Part 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, Chinese 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. 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.

[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.

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.

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. Currently, 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 Central Leading Group 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 was 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 typically also 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 Nationals 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.

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

[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.

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:

- 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:

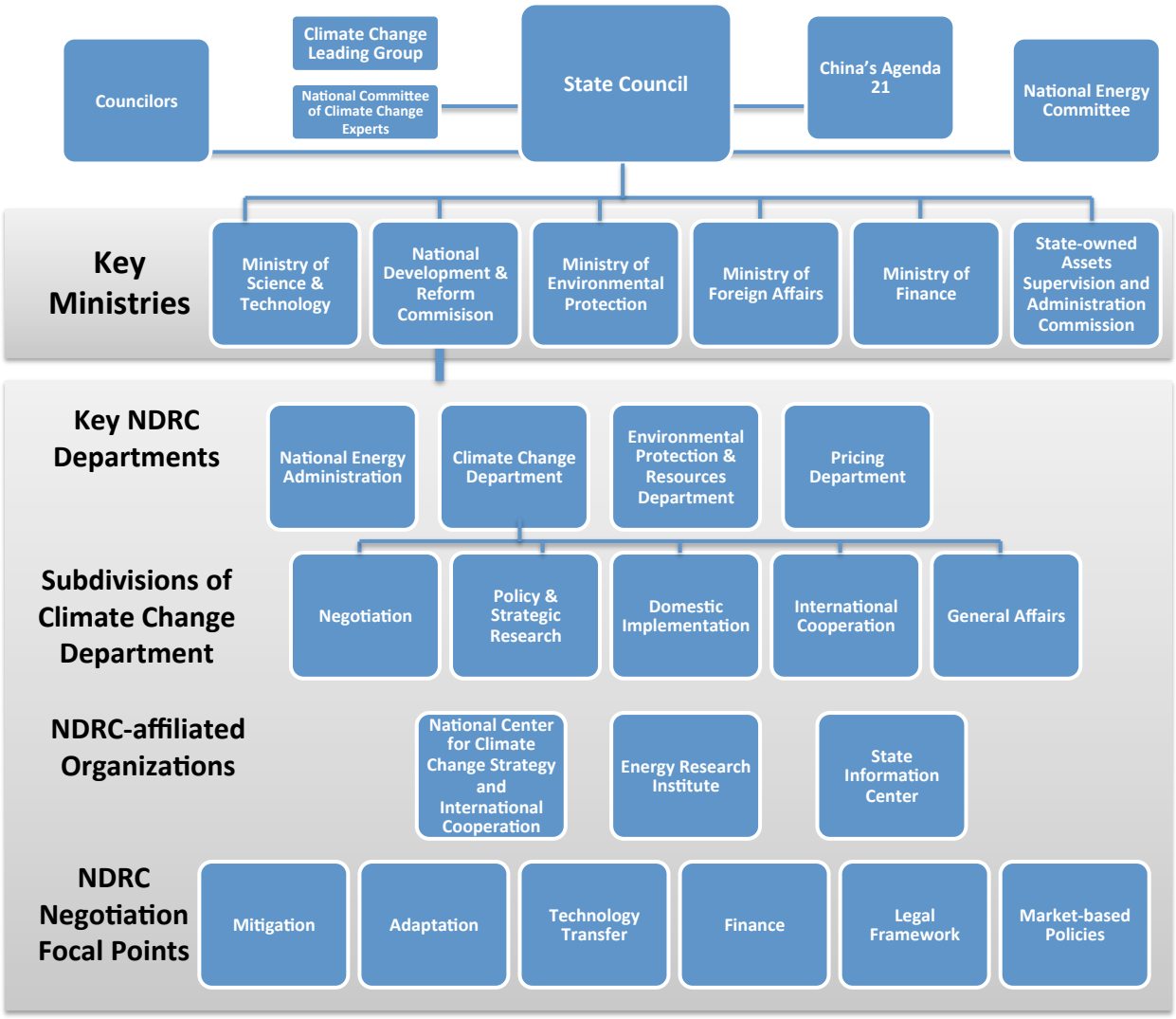
Ministry of Foreign Affairs
National Development and Reform Commission
Ministry of Science and Technology
Ministry of Industry and Information Technology
Ministry of Finance
Ministry of Land and Resources
Ministry of Environmental Protection
Ministry of Housing and Urban-Rural Development
Ministry of 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 2: State Council, NDRC and Affiliated Climate Policy Formation Organizations



Source: Authors' analysis

We analyze the composition of China's delegations to UNFCCC meetings since COP 20 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 Chinese delegation attendance at COP 20 and the February, June, September and October 2015 meetings of the Ad Hoc Working Group on the Durban Platform for Enhanced Action, the NDRC (including the NDRC's National Center for Climate Change Strategy and International Cooperation (NCSC)) is clearly the dominant organization, accounting for 40.7 percent of the total number of China's government delegates to these meetings. Due to UNFCCC limits on the number of delegates, Chinese officials also attend as delegates nominated by NGOs and other UNFCCC-accredited organizations. Our analysis does not capture these individuals. The table below shows participation rates of the NDRC and other agencies based on China's official delegates lists.

Table 1: Analysis of China's Delegations to Selected UNFCCC Meetings by Organization

Location	Lima COP20	Geneva	Bonn	Bonn	Bonn	**Total Delegates over five meetings**	**% of All Chinese Delegates**
Meeting Date / **Organization**	1-12 Dec 2014	8-13 Feb 2015	1-11 June 2015	31 Aug - 4 Sep 2015	19-23 Oct 2015		
Total Delegates	88	26	34	23	18	189	
NDRC	20	7	7	6	6	46	24.3%
NCSC	13	5	5	4	4	31	16.4%
MFA	8	5	4	3	1	21	11.1%
Tsinghua University	5	3	4	3	2	17	9.0%
State Forestry Administration	3	1	2	1	1	8	4.2%
Local Government	7					7	3.7%
MOST	3	1	1	1	1	7	3.7%
Chinese Academy Agricultural Sciences	3	1	1	1	1	7	3.7%
Ministry of Finance	2	1	2	1	1	7	3.7%
China Meteorological Administration	2	1	1	1	1	6	3.2%
Embassy Staff	4					4	2.1%
MEP	2			2		4	2.1%
Ministry of Transportation	1		1			2	1.1%
State Council	2					2	1.1%
ACCA21	1		1			2	1.1%
Civil Aviation Administration of China	1		1			2	1.1%
Chinese Academy of Engineering	2					2	1.1%
Ministry of Agriculture	1		1			2	1.1%
Chinese Academy of Social Sciences	1		1			2	1.1%
China NGO Network for International Exchanges	1					1	0.5%
Foreign Economic Cooperation Office	1					1	0.5%
No affiliation	5	1	2			8	4.2%

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 climatic prediction. It assists China in meeting certain national reporting obligations to the UNFCCC. It is also the national coordinator for China’s IPCC contribution.

As described in Part 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' INDCs 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 Part 3, Tsinghua University alone accounts for 9 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 3: Representative Expert Organizations Engaged in Climate Policy Formation

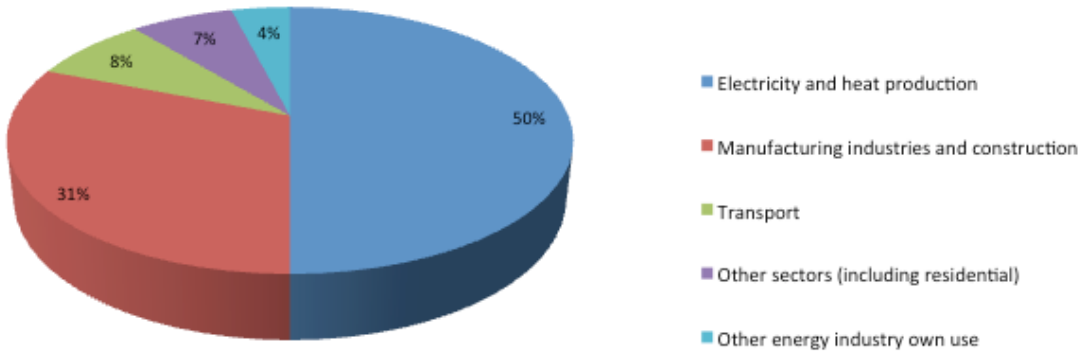
Source: Authors' analysis

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 their capacity 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.

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 4: 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 INDC 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, three types of standards are recognized: national, 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. They may engage specialized research institutions and university research groups to assist in standards development. Enterprises may also formulate their own standards, however we understand that this third category of standards represents internal guidelines for the particular enterprise, and thus have an unclear status under the Standardization Law.

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 5: Representative Industries and Enterprises Important to Climate Policy

Source: Authors' analysis

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. In almost all cases, this 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 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 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.

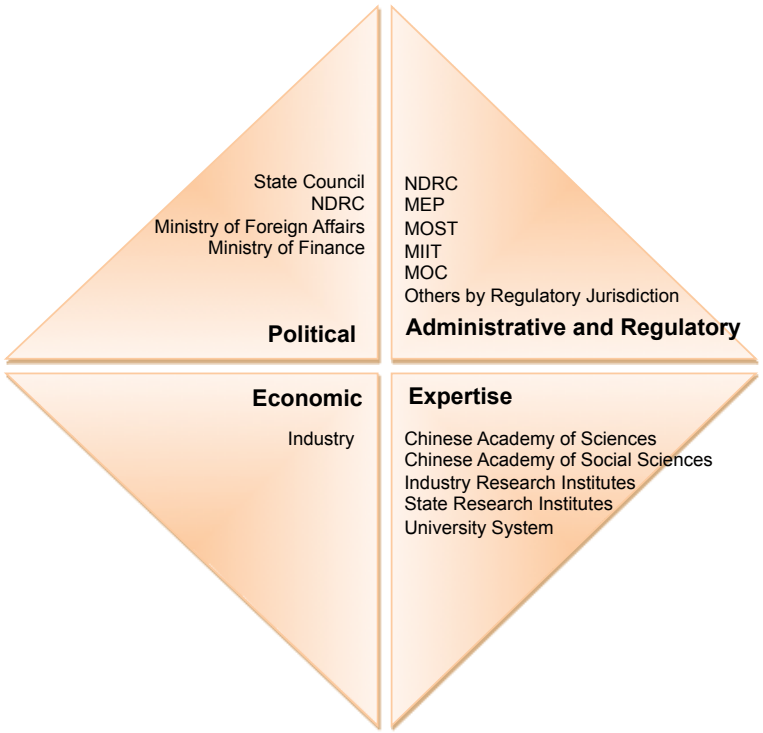
Administrative and regulatory power represents a base of authority related to political power but distinct in nature. Administrative and regulatory power is technical in nature and confined by grants of authority determined by political actors. The authority of the Ministry of Science and Technology and the Ministry of Environmental Protection, for example, is 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 6: 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 - that we depict in the figures below for each specific issue.

We distinguish between stakeholders that possess political power in the climate formation process, treating them as a lead agency in the process, and those that rely on administrative/regulatory authority as secondary agencies.

Mitigation

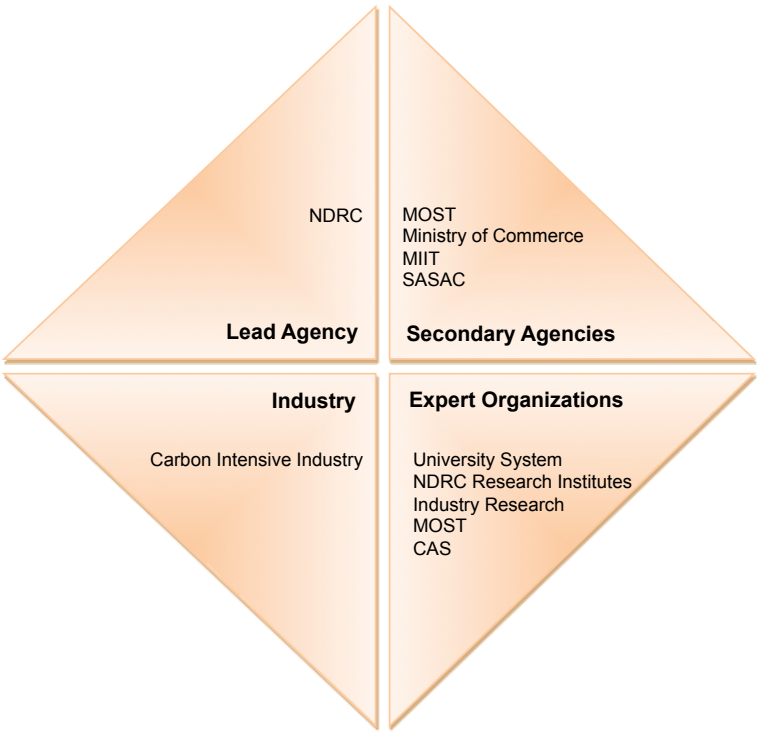
Mitigation of greenhouse gases significantly impacts the economy and therefore this issue is of immediate concern to a broad range of stakeholders. The NDRC and industry are key stakeholders along with various other government agencies and expert organizations. Mitigation potentially concerns all industrial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

The NDRC is organizing carbon pilot programs nationwide and is expected to emerge 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.

Figure 7: Policy Formation Cluster - Mitigation



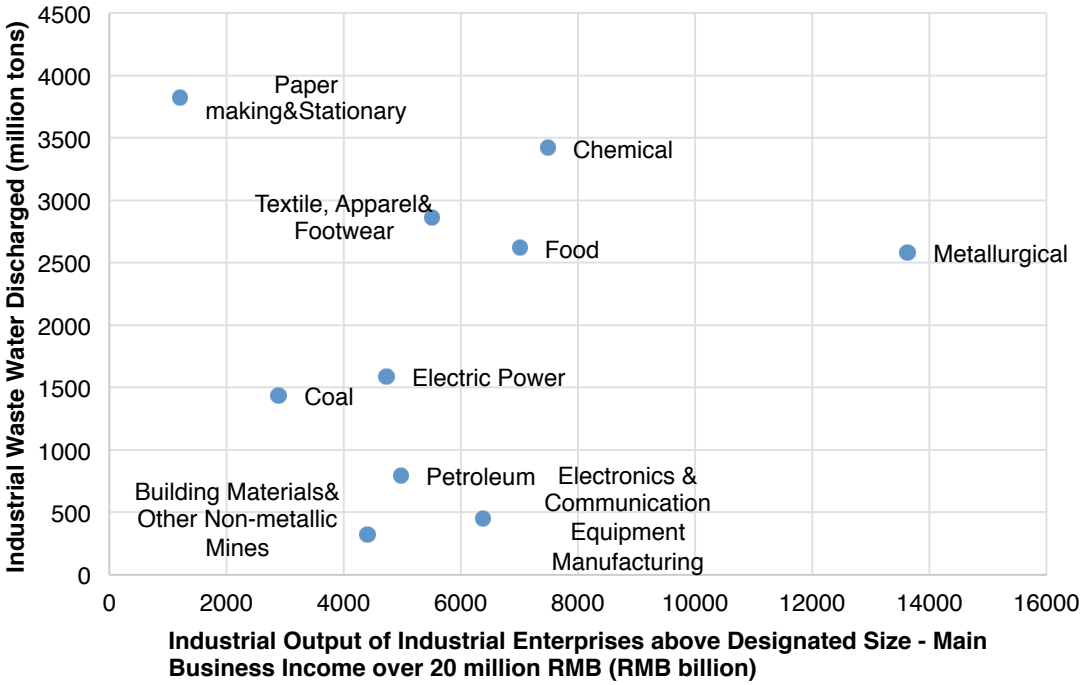
Source: Authors' analysis

Climate Adaptation

Climate adaptation is a unique cluster area because it is perhaps among the least developed policy formation clusters. To some extent, we believe this is because the impacts of climate adaptation differ across China and are felt differently by local communities. Climate impacts are only recently becoming more fully understood by stakeholders.

The forestry and agriculture industries are probably most aware of these issues, both due to potential adverse impacts and opportunities to participate in carbon emissions reductions projects in their sectors. The power sector, which depends on water for thermal and hydropower plants, and general manufacturing industries are only beginning to gain awareness of 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 likely to be most exposed to water risk based on their water pollution discharge volumes relative to value of industrial output.

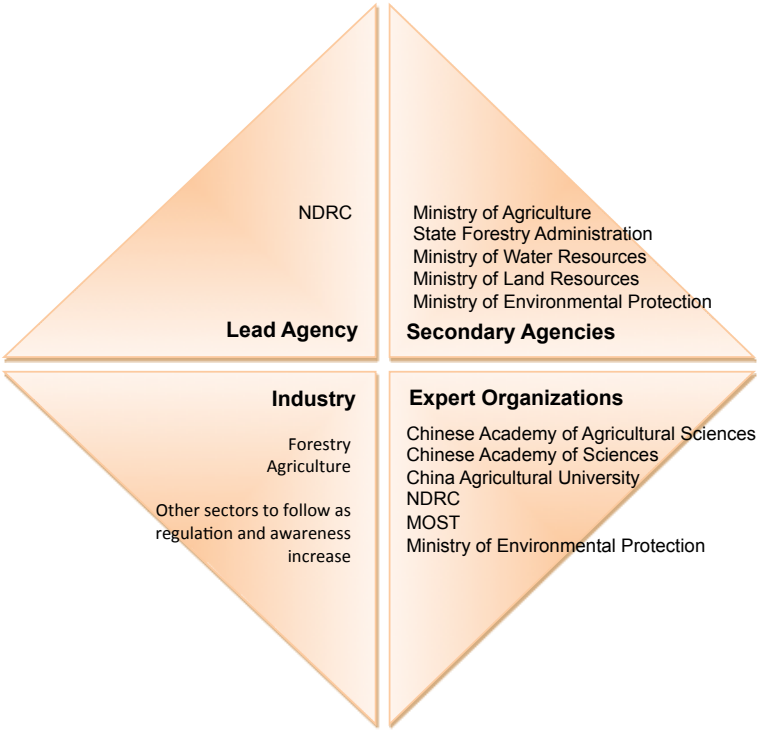
Figure 8: 2011 Top 10 Most Polluting Industrial Sectors



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. However, on sub-issues such as biodiversity, agriculture and forestry, the Ministry of Environmental Protection, Ministry of Agriculture and the State Forestry Administration together with the Ministry of Land Resources and Ministry of Water Resources, lead policy formation efforts. Relative to mitigation, fewer academic institutions have focused on adaptation, although research programs are established at the Chinese Academy of Sciences and research institutes associated with the various ministries engaged on adaptation issues.

Figure 9: Policy Formation Cluster - Adaptation



Source: Authors' analysis

Climate Finance

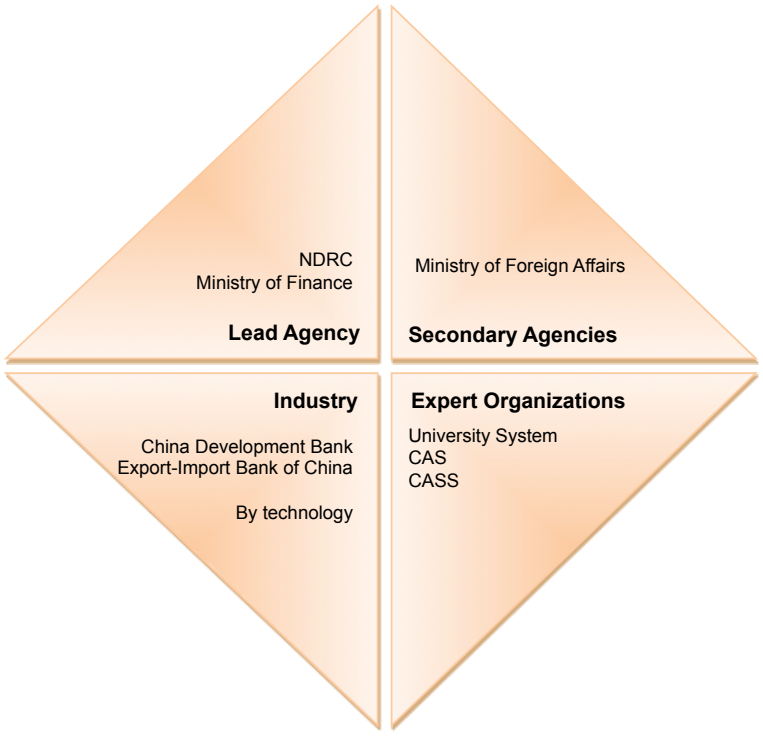
Under China's laws and administrative arrangements, the Ministry of Finance regulates international financial support to the Chinese government for projects to promote mitigation, adaptation, technology transfer or any other purpose. The Ministry of Finance will therefore play a role in climate finance negotiations to the extent they concern China's accepting outside financial support, such as from the World Bank or foreign governments.

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 also expanding bilateral South-South cooperation programs on climate change. These programs aim to provide financial, technology and capacity building support to least developed countries in Africa and South East Asia, as well as 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 both in terms of volume of funding, target countries and ministries engaged in South-South efforts.

Figure 10: Policy Formation Cluster - Finance



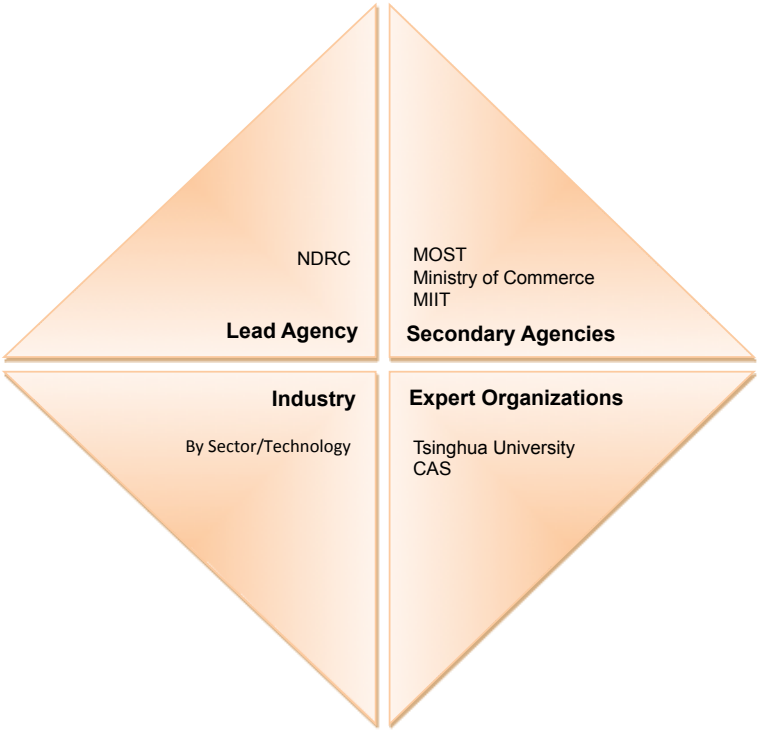
Source: Authors' analysis

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 12th 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 11: Policy Formation Cluster - Technology Transfer



Source: Authors' analysis

7. China's INDC

In this part, we examine the process by which China's Intended Nationally Determined Contribution or INDC was determined, its relationship to China's five-year planning process, and how it may influence the broader climate policy formation process both at the national and local government levels. We also consider the relationship between China's climate change mitigation goals in relation to its efforts to improve air quality as part of its War on Pollution, potential synergies and conflicts between these policies, and the implications of meeting these two goals from an economic and institutional perspective.

Overview of China's INDC

In its Intended Nationally Determined Contribution (INDC), 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 INDC further outlined economy-wide and sector-specific policies and measures to achieve its intended contributions (China, 2015).

Contributions not Commitments in Context

Country INDCs 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, as were contemplated under the Kyoto Protocol. The notion of contributions was also compatible with the positions of developing countries that reject the proposition that they should undertake obligations under the post-2020 agreement, respecting the principle of common but differentiated responsibilities.

China's INDC is clearly understood by Chinese officials to represent a means to negotiate with other countries in the UNFCCC process. Chinese negotiators are publicly advancing the proposition that the INDCs of all countries should be designed to hold global warming to a temperature rise within 2ºC of pre-industrial levels, a threshold not explicitly stated in the

UNFCCC yet widely regarded as essential to avoid "dangerous climate change" as provided under UNFCCC Article 4(2). China's own substantial efforts reflected in its INDC 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.

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 contribution concept fits well with China's concerns about accepting any restriction on its sovereignty or intrusion into internal affairs, a concern shared by other countries in the negotiations.

Process of Developing China's First INDC

Notwithstanding the positioning of the INDC 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 INDC were calibrated to be achievable with a high degree of confidence.

China's INDC was developed through a consultative approach that was designed to identify targets and activities to report to the UNFCCC. The process of developing the INDC 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 the NDRC research groups. The process relied heavily on NDRC's highly specialized expertise in modeling within its ERI and the NCSC. The NDRC also coordinated and external review process of possible INDC 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 INDC 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 INDCs. 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 INDC 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 INDC 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 INDC and the Five-Year Planning Cycle

China's first INDC 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 INDC was not integrated with China's 13th Five-Year Plan development process. Nevertheless, the development of the INDC is expected to inform the five-year planning process, as explained below.

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

Notwithstanding the conservative approach used in its development, China's INDC targets and actions meaningfully raised China's stated goals, and we understand that the process of developing the INDC 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 INDC targets can be used by the central government to guide local government efforts on climate change. Failure to achieve internationally announced INDC targets or actions carries reputational risk. In that sense, we believe the INDC may come to represent a minimum requirement for government officials to achieve.

In the longer term, under the pledge and review process of the post-2020 agreement, we expect that any future iterations of China's INDC will be the subject of analysis and intense debate by both domestic and international audiences. China's INDC represents China's leadership efforts on climate change. Thus, China's INDC 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 INDC in domestic planning. Future iterations of the INDC may also potentially integrate with future 5-year planning processes.

Coordination of Implementing the INDC with the War on Pollution

China's "War on Pollution", prompted by severe air pollution in China's major cities, encompasses responses to pollution affecting air, land and water. China is backing the effort 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 almost $84 billion in new investment in renewable energy technologies in 2014, representing almost a third of total global investment (REN21, 2015). The War on Pollution will further increase China's investment in environmental protection measures. In March 2014, China's Premier Li Keqiang announced the "War on Pollution" and backed the pledge by announcing trillions of Yuan of investment (Martina et al., 2014).

The Chinese government is coordinating its carbon and anti-pollution strategies. 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.

The War on Pollution and addressing climate change 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 involving 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 Jinnan 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 a research project 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 reduce 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. 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 options to reduce CO_2 are in fact available, however many of these do not reduce other forms of air pollution, such as forestry and agricultural 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, moving highly polluting industry to Western regions of China which have lower ambient pollution levels and provide relaxed thresholds for traditional pollutants and CO_2 emissions is already occurring among some industries (Martina, 2015). This "solution" to air quality problems will likely lead to increases in greenhouse gas emissions.

Another challenge of addressing both climate change and pollution together is posed by institutional divisions of authority between the NDRC, which is responsible for the regulation of, and accounting for 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.

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 development at the national level, there remains limited experience coordinating the actual implementation of policies on the ground among different ministries.

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 sets a short timeline for its achievement, effectively confirming 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.

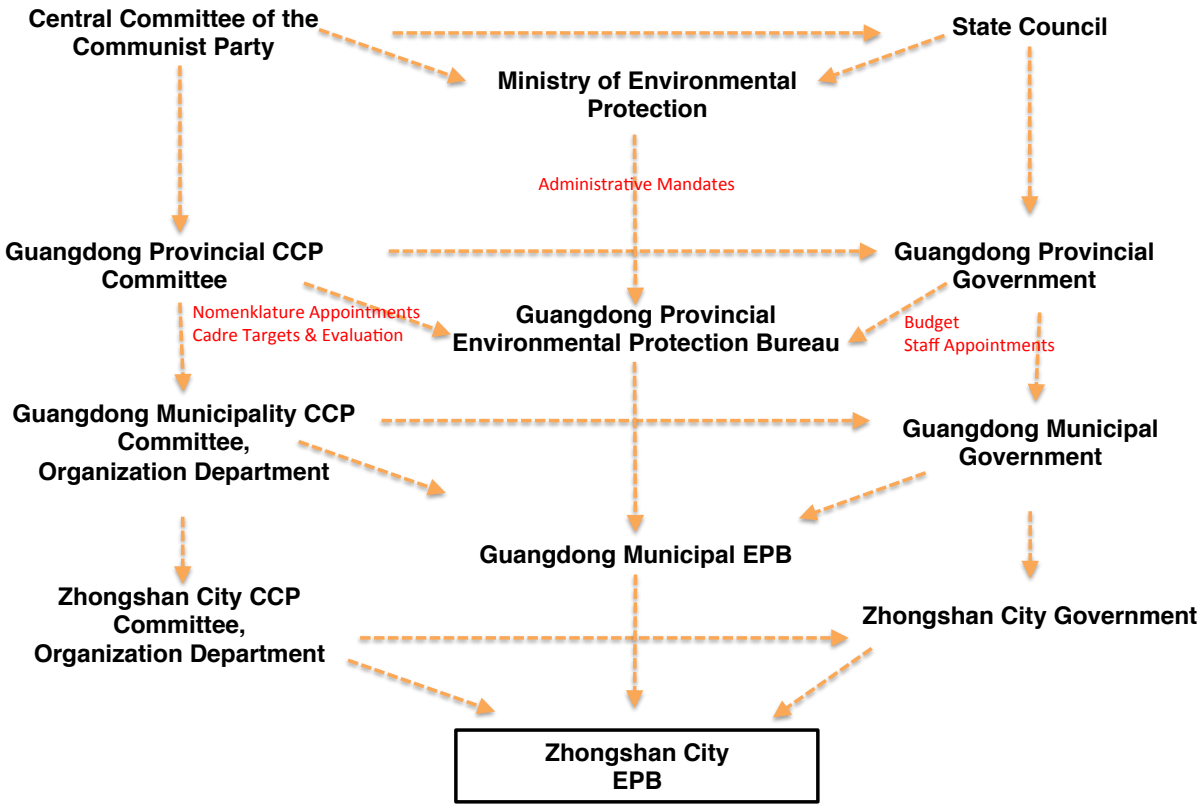
In terms of closer coordination among national level agencies, we believe the prospects for coordination are limited in the near term due to lack of established practice and limited resources. Both the NDRC and the Ministry of Environmental Protection possess rather modest-sized staffs. The Ministry of Environmental Protection employs some 500 full-time regular professional staff with an annual budget in 2015 of 4.99 billion RMB, and the NDRC maintains a staff of roughly 900 professionals and a 2015 budget of 1.72 billion RMB.[3] Their relatively small

[3] 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.

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 central, 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 personnel. Further, as described in Part 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 cadres through a 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.

Figure 12: Horizontal and Vertical Authority within China's Government



Source: Adapted from Lieberthal (2003).

This arrangement tends to undermine implementation of national policies concerning environmental protection that often conflict with the immediate-term interests of provincial and local government officials seeking to promote economic growth and jobs creation. Efforts to correct local government incentives to bring them in line with national environmental policies through personnel performance evaluation systems (See Article 26, Environmental Protection

Law of the People's Republic of China) have been potentially stymied due to possible manipulation of statistics (See, e.g., Wang, 2013), which further challenge coordination efforts in the absence of 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 them from local influence. In doing so, it would also strengthen the reach of the Ministry of Environmental Protection by creating a direct and 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 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 if successful.

8. 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 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 China's climate diplomacy is emerging as a tool of foreign relations, how China's yet to be defined Energy Revolution could drive broader climate policies, and how achieving China's INDC requires it to transition the focus of climate policy from the center to local implementation.

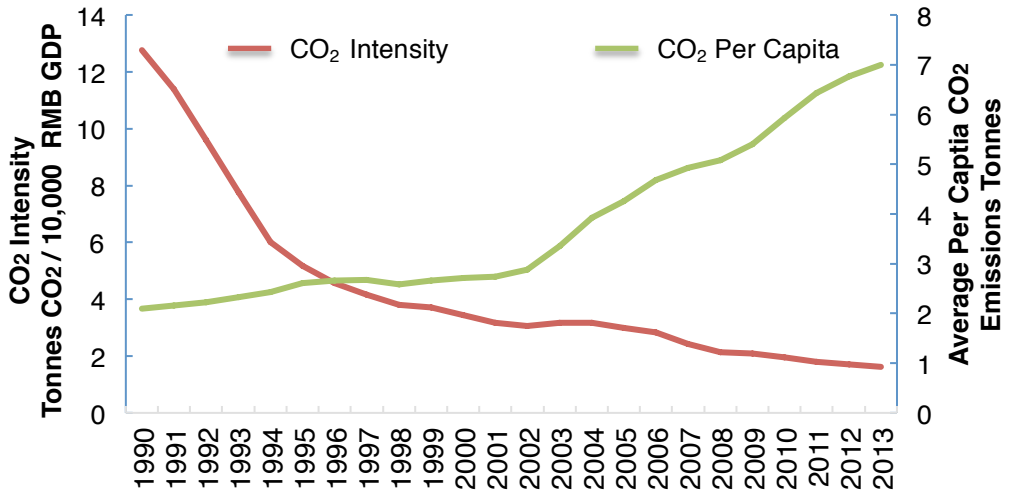
Climate and Environmental Policies Leading Broader Reform Agenda

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 economic development and the 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 through 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 mechanisms 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 showed sharp reductions 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 who produce products more efficiently and with less pollution.

Figure 13: 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 to be 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 examples of successful market-based environmental policies will 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).

Climate Diplomacy Increasingly Prominent in China's Foreign Policy

China's position in the international climate negotiations has undergone a transformation since the previous rounds of negotiations that produced the Kyoto Protocol and its extension to 2020. During these 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, China is taking a leading role among global actors in actively reducing its emissions.

China's contribution to reducing global greenhouse gas emissions as outlined in its INDC 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 particular, we see climate change more fully integrating with China's broader development assistance and foreign policy strategies with respect to G-77 countries that are the core of its climate negotiations alliance, especially as China launches the Asian Infrastructure Investment Bank and implements its "One Belt, One Road" engagement strategy.

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. President Xi and Premier Li have made several important public statements on climate change, emphasizing it is a priority for China. China's recent foreign relations policy statements on climate change include:

- 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).

- 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 Keqiang'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 INDCs should be reviewed every five years and the evaluation of country efforts should be transparent.

We note that the bilateral climate declarations between China and each of Brazil, the European Union, 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 ones. 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 compete 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.

We believe that 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, will become an important platform for China's climate diplomacy. It 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 with the world since ancient times. The policy is seen as essential to securing China's supply of energy as well as ensuring geopolitical stability along its borders. It will also strengthen China's own economy by fostering trade and redeploying China's excess capacity in infrastructure and other industries to support broader Asian development.

The strategy signals China's intentions to play an expanded role in Eurasia. According to the *Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road* issued by China 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, it states that "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, China is establishing the Silk Road Fund and the Asian Infrastructure Investment Bank (AIIB), both to be based in Beijing. The Silk Road Fund is a state-owned investment fund of the Chinese government. The AIIB is a multilateral bank comprised of over 50 countries that will focus on supporting infrastructure development in the Asia-Pacific region. According to its 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, 2015). 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.

China's foreign policy in the climate change area is aimed to secure international recognition of its status as a global power and role in international governance. Specifically, its initiatives in addressing climate change are clearly designed to place it on an equal footing in terms of effort

with developing countries, and more broadly to establish its role in the international system as an essential party among major powers. China's efforts in climate change are also clearly designed to further establish 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.

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. Significantly, in November 2015, China's Special Climate Change Envoy and lead negotiator Xie Zhenhua emphasized China's focus on assisting other developing countries, "Climate change adaptation will be at the center of our future cooperation with other developing nations." He indicated that 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 the climate change issue 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 is in line with Green Climate Fund policies, and whether their deployment will seek to achieve subsidiary objectives such as promoting Chinese companies as solutions providers, will shape the specific nature of China's climate diplomacy.

China's bilateral South-South climate fund is only one way in which China is pursuing expansion of its affluence abroad through helping other countries. China has long been a leading investor in developing countries, particularly Africa. As noted above, China is presently leading the establishment of the Asian Infrastructure Investment Bank (AIIB) to be based in Beijing that will institutionalize its leadership in the form of an inter-governmental international institution similar in mission to the World Bank and Asian Development Bank. Similarly, China's Ministry of Science and Technology has established a South-South cooperation center through which the Chinese government assists other developing countries by facilitating their adoption of low-carbon emissions technology in collaboration with Chinese companies.

Through these efforts, China is seeking to secure its reputation as a leader in climate change and global environmental governance on an equal footing with developed countries, while strengthening its relationships with its traditional negotiation partners in the G-77.

China's Energy Revolution

In mid-2014, President Xi Jinping announced China will launch an "energy revolution" that promises to address both energy security and pollution. We understand that the Energy Revolution targets will be significantly more ambitious than those in China's INDC. As suggested by its name, China's Energy Revolution will take a more holistic approach to energy policy, contemplating 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.

Although details of the Energy Revolution are yet to be announced, we understand 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 and decline afterwards.
- Enhancing 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 INDC.
- 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 INDC.
- Feed-in-Tariff for renewable electricity and electricity surcharge for renewable energy.
- 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, promotion of clean coal technologies.
- Promoting the development and adoption of electric and plug-in hybrid vehicles.
- Greatly expanding public transportation options, increasing ridership and discouraging ownership or use of private vehicles.
- Expanding 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.
- Promoting China's national carbon emissions trading scheme to be implemented in 2017.

China's INDC 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 signaling their commitment to these programs 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 INDC.

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 INDC 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.

Engaging local government to overcome 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 a credible emissions monitoring, reporting and verification system, and an enforcement mechanism 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.

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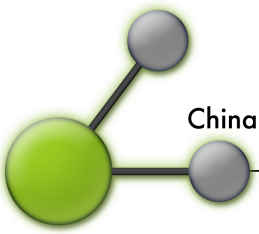
Key Policy Documents Relating to Climate Change

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*
2012.07	MOST NDRC	*National Scientific and Technological Actions on Climate Change During the 12th Five-Year Plan Period*
2013.05	NDRC National Bureau of Statistics	*Opinions 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 State Council	*Opinions 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 State Council	*Integrated Reform Plan for Promoting Ecological Progress*
2015.11	NDRC	*China's Policies and Actions on Climate Change*



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