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The Political Economy of Low-carbon Energy Transition: the case of China

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The Political Economy of Low-carbon Energy Transition: the case of China

By

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B.A., Emory University, 2017

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An abstract of
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Abstract

The Political Economy of Low-carbon Energy Transition: the case of China
By Caiwei Huang

A primary question asked by scholars of central-local relations in authoritarian regimes is how policies decided at the national level are effectively implemented at the sub-national level. In China, the central government seeks to maintain local compliance through institutionalized political centralization and economic decentralization. However, sub-national actors still maintain substantial autonomy to vary implementation of central policies.

This thesis turns our attention to provincial leadership. I argue that the extent of policy implementation can be conceptualized as a result of interaction among province governors' career incentives, the province's state capacity, and economic interests. A province that has more state capacity has more bargaining power vis-à-vis the central government and local vested interests. Thus, given high capacity, governors seeking to maximize career advancement would endeavor to overcome both market and institutional barriers and develop a renewable-friendly framework. By doing so, province governments demonstrate not only compliance with central directives, but also policy competence and the ability to coordinate between interest groups and create new winning coalitions.

I test this theory by examining the case of renewable energy policy implementation in China. This thesis finds that while there is a general increasing in overall commitment to renewable energy over the period of 2001 to 2015, the variation across provinces increases. This shows that under the current institution, province governments are indeed responsive to shifts in central priority. Furthermore, governors with higher career incentives and has higher capacity are more committed. It can be argued that a highly motivated province governor with high state capacity is able to overcome economic interests to ensure the implementation of renewable energy policy.

This thesis also develops a new approach to analyzing province compliance to renewable energy policy. Given the political dynamics of Chinese policy making, current methodology is not suitable for analyzing policy compliance in China. Thus, for this thesis, I use methods of text-analysis to score province policies' commitment to renewable energy and created a Commitment to Renewable Index. This is used as a measure of province governor's willingness and likelihood to implement renewable energy policies.

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1. Introduction

A primary question asked by scholars of central-local relations in large states is how policies decided at the national level are effectively implemented at the sub-national level. This issue is particularly trying for decentralized authoritarian regimes, which often struggle with the tension between "the need to foster economic development by empowering local officials and the regime's imperative to control them politically" (Landry, 2008). In the case of China, early scholarship debated whether China's economic miracle was a result of political and fiscal decentralization (Weingast, 1995) or Beijing's growth-enhancing policies (Cai and Treisman, 2006). Currently, it is widely agreed that China's central mechanism of policy compliance is through institutionalized fiscal decentralization and political centralization (Chong, 2000; Xu, 2011; Zheng, 2014). The central government's ability to restrict decentralization to its fiscal components allowed the country to benefit from local experimentation and bottom-up initiative (Heilmann, 2008). At the same time, since the promotion of top province officials is still controlled by the center, provincial leadership has incentives to comply and implement central directives. However, do province governments always exercise local discretion in the fashion intended? Even when Beijing can intervene and control provincial affairs, the question remains: what accounts for the variation in adherence to policies set at the central level? Treisman (2007) warns against valuing decentralization as an institutional configuration for its own sake, recommending instead the study of political strategies and behavior of subnational actors. Specifically, provincial governments are major players in the Chinese economy, where they can initiate, negotiate, implement, or even resist reform (Chong, 2000; Xu, 2011; Tucker and Lewis, 2015).

This thesis turns our attention to provincial leadership to explain the great discrepancies that are "easily observed in almost every policy area between local policy implementation and the center's policy mandates" (Zheng, 2010). I argue that the extent of policy implementation can be conceptualized as a result of interaction among province officials' career incentives, the province's state capacity, and economic interests. I test this theory by examining the case of renewable energy policy implementation in China. Increasing renewable energy into China's energy mix has become the central government's new priority. By examining policy implementation in this area, this thesis calls into question whether the established institutions of central-local relations can accommodate the new economic growth model and aims of the twenty-first century, which seeks to shift China's economy from investment-led growth to a more environmentally sustainable and socially equitable model. These shifts in long-term national strategy often conflict with short term economic development goals prioritized by provinces and thus face resistance from actors that benefit from the status quo. This thesis argues that a province governor with high career incentives in a province with high regulatory capacity is able to overcome resistance from local vested interests. As more developing countries are shifting decision-making authority to lower administrative units and looking for more sustainable development models, the case of China can provide important lessons and insights.

This thesis examines renewable energy policy implementation in China as a case study. Renewable energy policy is not only important for its environmental benefits. It is an important piece of economic policy that affect every major component of president Xi Jinping's deepening reform promises, especially that of economic restructuring. Introducing renewable capacity will require state-owned enterprise reform and upset existing coal industry which provide

employment and tax revenue for province governments. Technologically, it requires building smart grids and enhancing energy storage. Thus, this transition is an enormous task with many challenges.

In 2006, China surpassed the United States to become the world's largest source of emission of carbon dioxide. Furthermore, over 70% of China's emissions come from its energy sector, primarily by burning coal. Recognizing the various economic, political, and social cost of carbon emissions, China has in the last decade pursued aggressive renewable energy policies. This thesis looks at the variation of renewable energy policy as a case study of policy implementation. Internationally, it is recognized that the government plays an important role in the first stages of introducing renewable energy. Given the high start-up cost of building renewable generation, governments worldwide, including first adopters such as US and Denmark, provide substantial subsidies to building renewable capacity. Due to the high cost of electricity production, the price of renewable source generated electricity not competitive. Thus, globally, a popular policy is for government to provide feed-in tariff on renewable source generated electricity. Some countries also adopted renewable portfolio standards (RPS), which requires grid companies to buy a certain amount of renewable generated electricity.

In China, the central government has made great strides towards building a coherent national plan for renewable energy development (Lema and Ruby, 2007), including passing the Renewable Energy Law in 2005. Domestically and internationally, China has set ambitious mitigation targets, including an increase in non-fossil energy resources to represent at least 20 percent of total energy by 2030. However, this enthusiasm for renewables is not shared

universally by province leaders, who are tasked with implementing these targets. By 2011, only 21 provinces had formulated and adopted renewable energy policies, while 10 others had not. (Yi and Liu, 2014). Within the 21 provinces, some had adopted vague general directions while others set specific development strategies and targets. This is especially puzzling because the variation in renewable adoption does not follow expected patterns. Since renewable energy potential is not evenly distributed amongst provinces, we might expect provinces with the greatest potential to develop renewable energy to be the most enthusiastic.

In 2008, the Chinese Meteorology Administration conducted a comprehensive survey of the distribution of renewable energy potential in China. Most wind energy is concentrated in the Northeast region, where Inner Mongolia, Xinjiang, and Jilin had the highest wind potential. Thus, I expect that these provinces will be at the forefront of renewable energy potential. Furthermore, both Inner Mongolia and Xinjiang were part of first adopters of wind energy, whereby the central government gave huge subsidies to jump start their renewable energy capacity building (Liu and Kokko, 2007). However, given the same financial support from the central government, Inner Mongolia was able to jump ahead through supporting central effort with a comprehensive set of province policies (Lema and Ruby, 2007). On the other hand, Xinjiang did not make use of this opportunity and lagged behind in renewable generation. It was only when Nur Bekri became the chairman of Xinjiang in 2008 did renewable energy development kick off in the province. Meantime, other provinces with average renewable potential, such as Hebei, were able and willing to utilize the central mandate to develop carbon emission trading systems

What then explains this variation? This paper look to the agency of executive officials at the province level for explanation, specifically at the career incentives of the province governors, their regulatory capacity, and existing economic interests. A province that has more state capacity has more bargaining power vis-à-vis the central government and local vested interests. Thus, this thesis argues that given high capacity, governors seeking to maximize career advancement would endeavor to overcome both market and institutional barriers and develop a renewable-friendly framework. By doing so, province governments demonstrate not only compliance with central directives, but also policy competence and the ability to coordinate between interest groups and create new winning coalitions.

1.1. Research Design

This paper follows China's renewable energy policies through three Five Year Plan (FYP) periods. The central government first started considering renewables policies strategically in the 10th Five Year Plan (2001-2005) and its commitment increased through the 11th FYP (2006 – 2010) and the 12th FYP (2011 - 2015). I test this theory empirically by looking at how the above factors affect each province's commitment to renewable energy development using a nest analysis approach – combining a quantitative analysis of province implementation with the comparative case study of Inner Mongolia and Xinjiang (Tucker and Lewis, 2015). This combined the advantage of each type of analysis; Large-N statistical analysis has "the ability to simultaneously estimate the effects of rival explanations and/or control variables on an outcome of interest", while small-N case studies can "answer those questions left open by large-N

analysis" (Lieberman, 2005). I also conducted interviews with several province level officials to supplement the quantitative analysis[1].

1.1.1. Commitment to Renewable Energy Index

For this thesis, I develop a new approach to analyzing province compliance to renewable energy policy. In studying policy implementation of the US, states either choose to implement or not implement federal policies. This can easily to coded as a binary 0 or 1 (Carley, 2009; Sarzynski and Sharimali, 2012; Shrimali and Jenner, 2013; Zhang et al., 2016). However, this methodology is not suitable for analyzing policy compliance in China, since province governments often demonstrate policy non-compliance through policy delay instead of non-implementation. Thus, for this thesis, I use methods of text-analysis to score province policies' commitment to renewable energy. Commitment is measured by indicators reflecting 1) strength of renewable ambition and 2) likelihood of policy implementation. I gather and code publicly-announced province policies, from the period of 2001 to 2015, that are relevant to renewable energy development. The province Five Year Plans (FYPs) and energy FYPS obtained from various government websites. I obtain province level wind policy data from Zhang et al. (2016), which collected province level policies from 2000 to 2012. For province level solar policies, I refer to Province Solar Policy Report 2014 published by the National Energy Administration. My

[1] I obtained IRB clearance to conduct interviews. From Henan province, I interviewed policy makers from Renewable Energy Department of Henan Development and Reform Commission and the acting CEO at Yutong Company. I have also interviewed a policy maker from Shanghai, who was involved in Shanghai's Emission Trading Scheme pilot. Several informal interviews were conducted with policy makers from the National Reform and Development Commission in Marrakesh, during UNFCCC COP22. These interviews served as insightful anecdotes to the interests of various actors, at the central and the province level.

research assistant and I then combed through the province development and reform commission website to update both wind and solar province policy data to 2015. Other data, such as province government tax revenue, province coal production and consumption, number of workers employed in state-owned enterprises, are obtained from All China Data Online.

This thesis finds that while there is a general increasing in overall commitment to renewable energy over the period of 2001 to 2015, the variation across provinces increases. This shows that under the current institution, province governments are indeed responsive to shifts in central priority. Furthermore, governors with higher career incentives and has higher capacity are more committed. It can be argued that a highly motivated province governor with high state capacity is able to overcome economic interests to ensure the implementation of renewable energy policy.

1.2. Thesis value added

1.2.1. Political Economy Framework

This paper contributes to the emerging literature on energy politics. Political scientists have noted that environmental politics literature "has largely focused on descriptive case studies" and thus is "lacking in clearly articulated, parsimonious, and widely applicable theory." (Steinberg and VanDeveer, 2012; Cao et al., 2014). Thus, by examining how interests are organized and how coalitions that favor/oppose reforms are shaped at the province level, I seek to develop a more comprehensive political economic framework for analyzing China's clean energy politics.

This thesis also underscores the need for a better understanding of political factors in the study of renewable energy policies. Against the backdrop of the global transition to low-carbon economics, it comes as no surprise that China's sustainable energy system has been extensively studied. However, most studies focus on the development of green technology (Liu and Gallagher, 2010), while a large number of public policy scholars and scientists have drawn national low-carbon road maps (Su et al., 2012; Zhang et al., 2013). Since many papers do not consider political factors such as governor's motivations, many recommend national policies that are politically difficult, which conflicts with the provinces' short-term economic goals or does not create enough incentives to promote local mobilization (Qi, 2016; Davidson, et al., 2016). In recent years, policy scholars have increasingly recognized the importance of political motivations and called for the development of political economy frameworks in the analysis of renewable energy policy. Davidson et al. (2016) proposes a general political economy framework for China's wind power by delineating the political and economic actors and their interests. Andrews-Speed (2012) argues that the effectiveness of policy implementation depends on a wide variety of factors, from "the extent to which the large state-owned enterprises can be used as instruments of policy, the degree to which energy policy objectives converge with or diverge from other priorities, and the willingness of government officials to innovate" to " the approaches taken by the central government itself, to the nature of the policy discourse, to the range of policy instruments chosen, to the capacities and strategies of the implementing agencies, to the interests and responses of the affected parties, and to the role of the legal system." While these works are comprehensive, they do not provide any theoretical predictions as to how each factor affects policy implementation.

On the other hand, research on the politics of China's energy reform tends to be focused on fragmentation amongst various national bureaucracies (Lema and Ruby, 2007; Zhang, 2015; Cunningham, 2015), weak regulation and resistance from grid companies (Ling, 2010; Tsai, 2011; Xiu and Li, 2012), and elite policies (Yeh, Lewis, 2003). These works explain why China used cheap coal to fuel its economic miracle and the subsequent difficulty in reforming the all-too-powerful State-Owned Enterprises (SOEs) in the power-generation industry. Again, the role of the province government is neglected, and less is said about how the Chinese institutions can accommodate the shift to a sustainable economic development pathway. Thus, it is also the goal of this thesis to bridge these research gaps – to provide theoretical predictions on the effects of political factors on renewable energy development and to update the research on the politics of China's energy system reform. This provides valuable insights for developing countries that are seeking transform its own energy system or more sustainable development pathways.

1.2.2. International Applicability

As China alone contributes to 25% of global greenhouse emissions, global climate action is ineffective without its participation. Furthermore, China's renewable energy development experience is similar to that of many developing countries and thus can provide important comparative perspectives. Lema and Ruby (2007) explains that "what China is experiencing now, and other developing countries will experience in the future, is that there are economic, political and social pressures both from within and internationally to reduce growth in energy consumption and diversify the energy mix". Lessons from China should prompt developing countries to think about using renewables to meet rising energy demand, instead of considering only the cheapest source at hand. Once capital is spent, it is particularly difficult for alternative

fuels – where the operation cost is much higher – to unseat the incumbent. Specifically, China's case is particularly relevant to India and South Africa, which are also developing countries with large coal reserves. In 2002, coal accounts for 75% of India's total energy generation and 92% that of South Africa. As Heller (2004) argues, "…primary fuel matters because the systems for supplying primary fuels are organized very differently, … and the interaction between the organization of the fuel system and the operation of the power sector" operated differently.

China's political institutions for reform can also provide important lessons for other large, decentralized states. The level of political and economic decentralization affects pathways to reform. In centralized system, such as Brazil "it may be easier for reformers to gain leverage over the reform process and direct it strategically from the center" while reforms in decentralized systems "may proceed in a more chaotic decentralized fashion" (Heller, 2004). In this aspect, China's energy system is comparable to that of the US and India. The degree of decentralization is important because it shapes the policy space that sub-national actors operate in. With regards to political institutions, the US is considered more decentralized. Unlike China, the US does not have a comprehensive national policy in place for the promotion of renewable energy. Furthermore, political decentralization means that individual states can enact their own renewable energy policies through state legislature Consequently, "much of the U.S. renewable electricity installed capacity is a result of state deployment initiatives rather than federal programs, with 30 states having a renewable portfolio standard in place to encourage deployment" (Campbell, 2014). Likewise, India has given much policy making autonomy to its provinces. India's Electricity Act of 2003, for example, requires all state-level energy regulatory commissions to encourage electricity distributors to procure a specified minimum percentage of

power generation from renewable energy sources. As a result, much of the implementation was left to the states and great variation in policies occurred (Lewis, 2013). For example, many Indian states have set feed-in tariffs to support wind power development, but the actual rate ranges from 3.14 rupees per KWh in Kerala to 4.5 rupees per KWh in Rajasthan.

1.3. Thesis overview

This thesis proceeds with an overview of current literature on central-province relations, examining the institutional structure province governments operate in and their decision-making choices under this environment. Section 3 discusses my theory for explaining province governor's decision-making behavior. In Section 4, I apply this theory to the case of China's renewable energy policy implementation. This is followed by an "large"-N analysis of 30 provinces and the discussion of results in Sections 5 and 6. Section 7 concludes this thesis and offers some policy recommendations based on the findings of this thesis.

2. Literature Review

2.1. Administrative Structure

Currently, China has four sub-national administrative levels, Table 1. Since the post-Mao push for decentralization, the province level has become the most important sub-national unit in the Chinese system. This study includes 30 provinces, which excludes Taiwan and two special administrative regions. Today, province carries the equivalent rank of a ministry in Beijing and

its party secretaries are important politicians in the political system (Saich, 2015) and they make up a considerable faction in the central committee.

Table 1: The Structure of China's Local Administration (2013)

Level	Varieties and numbers	Total
Province	Provinces (excluding Taiwan): 22 Centrally administrated municipalities: 4 Ethnic minority autonomous regions: 5 Special administrative regions: 2	**33**
Deputy-province[a]	Deputy-provincial cities 15	15
Prefecture	Prefecture-level cities: 271 Prefectures:14 Autonomous prefectures: 33	318
County	Counties: 1,442 Autonomous counties: 166 County-level cities: 368 Urban districts: 872 Others 5	2, 853
Township	Townships: 12, 812 Towns: 20, 117 Street communities: 7566 Others:2	40, 497

Sources: Statistical Yearbook of China, 2014; Chong, 2016
Notes: (a) Deputy-provincial cities are, in official terms, prefecture level units but are generally categorized separately from other prefecture-level cities because of their special privileges in many economic domains

The frequency of institutional changes to China's local administration has been high during the Post-Mao era. Currently, there are much debate about prefecture-level units and whether they should be abolished. In the 2009, the State Council called for "localities with proper endowments" to "set up a few experimental sites for the provinces-directly-ruling-counties policy" (Chong, 2016). By the end of 2010, 50.2 percent of the counties came under the direct control of provincial authorities. As such, provinces vary in their ability to control lower level

administrative units. With regards to policy implementation, it is still unclear whether direct rule would lead to more effective implementation.

The subsequent literature review section seeks to locate province government in China's governance institutions and policy making process.

2.2. Fragmented authoritarianism

Prominent scholars of China studies describe China's policy making process as governed by the concept of "fragmented authoritarianism". Lieberthal and Oksenberg (1988) uses the concept of "fragmented authoritarianism" to capture two paradoxical observations about China's political system – that 1) at the very peak, power and authority are concentrated in the hands of small group of party leaders while concurrently 2) bureaucratic authority below the very apex of the political system is fragmented along vertical and horizontal fault lines (Lieberthal,1992).

The implementation of almost every policy area in China requires coordination between ministries. National renewable energy policy, for example, is lead by the National Reform and Development Commission (NRDC) and National Energy Administration (NEA), and coordinated with Ministry of Finance, State-owned Assets Supervision and Administration Commission of the State Council (SASAC), Ministry of Land Resources, Ministry of Industry and Information Technology (MIIT), and over 10 ministries. These separate functional organizations, including various ministries, have equal rank according to China bureaucratic ranking and therefore cannot command each other. Besides, these vertical systems intersect with

a multitude of horizontal territorial systems from provinces to townships. So at every intersection, several organizations are involved for a single issue (Qian, 2016). The possible ways to make decision and coordinate behavior include command by hierarchy, voting, and bargaining. As no single organization is superior over another and voting has been avoided, the system falls back on bargaining where decisions are made by rule of consensus and mutual accommodation.

This complex institutional structure give rise to a specific form of policy decision-making dynamic, as described by Lieberthal (1988):

Policy X resulted from a bargain among Ministries A, B, and C and Province D either 1. brokered by one or more top leaders, 2. arranged by coordinating staffs acting in the name of one or more top leaders, or 3. negotiated by the supra-ministry coordinating agency, and ratified through routine procedures by the top leaders. Disgruntled Ministries E and F, losers in the deal, planned to pursue strategies to erode the agreement. The bargain sought to reconcile the conflicting organizational missions, ethos, structure, and resource allocations of the ministries involved.

Thus, an important conclusion from fragmented authoritarianism that the 'fragmented and disjointed' bureaucratic authority lead to the emergence of a bargaining system within the governing bureaucracies (informal institution), 'in which it is often necessary to achieve an agreement among an array of bodies, where no single body has authority over the others', thus requiring consensus building and bargaining (Lieberthal, 1992).

However, this concept does not lead to any theoretical expectations or testable hypothesis. Thus, using fragmented authoritarianism as a backdrop, many scholars have explored specific lines of fragmentation in China's policy making process. In Wang (2015)'s study of judiciary system, fragmentation is measured based on whether judges adjudicated cases differently at various levels, assuming that fragmentation resulted in differing incentive structures for judges at each hierarchal level. Qian and Mok (2016) modelled the logrolling bargaining between two ministries using formal game theory. This concept is also often applied to the study of China's environmental and energy policies. In "Fragmented Authoritarianism, 2.0", Mertha (2009) argues that fragmentation has created policy spaces for policy entrepreneurs to influence environmental policies. Others, while not explicitly referring to the concept, have explored the conflict of interest between state-owned enterprises and central government and how it impedes growth in renewable capacity. For this thesis, the fragmented nature of China's policy making process underscores the important agency of province leadership. Given the often diverging interests between various bureaucracies, it is often up to the province governor to coordinate between different interest and reach consensus to push policy forward. This will be further explored in Section 2. 6. Province Leadership.

2.3. Central-Political relations

The simple fact that China is a large country requires that province government, as middleman, plays an essential part in policy-making process. During an interview, a province official describes his responsibility vis-à-vis the central government as such: "central makes decisions,

local implements" [*zhongyang juece, difang luoshi*] (Henan DRC, interview, 2015). The state council regularly issues directives to the provincial governments for implementation, refinement, transmission to sub provincial units. Policy implementation in China allows for flexibility and fine-tuning at the provincial level because the provincial government is often given the discretion to decide the details and schedule of implementation (Donaldson, 2017).

During the Mao era, province and all subnational actors were mere implementers of central policies. Central planning also meant the imposition of one single policy, or a uniform model for the entire country, without considering local context. This approach of "cooking in one pot" (*yiguozhu*) was changed to "eating from different pots" (*fenzao chifan*) in the post-Mao era. Deng Xiaoping and his pro-reform leadership successfully marshalled support of the provinces for his reform program through decentralization of economic and fiscal power in his "playing to the provinces strategy" (Cheung, 1998). Consequently, 1979's version of Local Organization Law removed the clause, for the first time, that "local government are not allowed to interfere with domains of vertical control" (Donaldson, 2017). This opened up space for lawful local discretion in policy implementation. However, the initial stages of reform were not without set-backs. The incremental nature of China's reform process enables provincial leaders to interpret central policies more liberally than if central policies are more clearly defined. This problem was recognized by the top leaders in China. In Jiang Zemin's 195, the then party-sectary not only openly recognized the existence of contradictions between Central and localities, but also called for more compliance from the localities towards the central government (Chong, 2000). As such, another phrase that is often used to describe China's central-local relationship is "the higher-ups have policies, the lower levels have countermeasures" [*shangyou zhengce, xiayou duice*].

Province governors are also responsible for functional work directly linked to local interests, hence compelling them to "serve two masters" at the same time. Such competing demands on the provincial leaders make the study of provincial leadership and their reform performances even more interesting.

2.3.1. Economic Decentralization

One important aspect of the 1980s reform is economic decentralization, which the Chinese state justified on the grounds of economic efficiency. Theoretically, proponents of decentralization argue that the process can "bring the government closer to the people". Since local governments are close to the residents, they have more local information and find it easier to respond to differences in tastes across jurisdictions. Weingast (1995) suggests that decentralization can stimulate economic development and the experience of China's economic growth is indeed a testament to that.

2.3.1.1. Fiscal reform

In 1994, Beijing introduced major reforms to China's financial system with the intent to provide the central government with greater fiscal capacity. The reform raised the central government's share of state revenue to at least 60 percent, with 40 percent as central expenditures and 20 percent as transfer grants to local governments (Saich, 2015). In contrast to the old system, which gave the central government only a set amount of revenue, the new system designates different categories of taxes to central and local government (Wang, 2011). This unique tax-

sharing system, which was formalized in the Budget Law, divide taxes into 3 categories - central taxes, local taxes, and shared tax (Wang, 2011; Saich, 2015). Wang (2011) shows that the reform resulted in a significant decrease in the province share of the budget. Combined with increased policy responsibilities, this resulted in an imbalance between province government responsibility and fiscal capability. Province governments, tasked with providing public goods and delivering social welfare, thus face enormous pressure to maintain and expand local budget. Wang (2011) argues that the need to maximize local revenue thus provided impetus for competition amongst provinces for resources and development opportunities. Through successful local experimentation, province governments can push for favorable central government policies in order to develop these new industries.

2.4. Political Centralization: personnel management system

The primary way for Chinese central government to maintain political control is through its personnel management system, whereby the promotion of province officials is determined by the central government (Landry, 2008). In essence, it offers political and economic incentives to motivate local officials to accomplish centrally allocated policy targets. This target-based responsibility system induces performance competition among local officials, which leads to a "tournament for promotion". This is an efficient enforcement mechanism because the amount of power and type of official position is important in a nomenclature system (Chong, 2000; Landry, 2008). Furthermore, as Landry (2008) argues, "since formal and informal economic returns are tied to bureaucratic rank, the appointment game is also an economic incentive mechanism to induce compliance".

However, the current cadre assessment system may have negative impacts on the quality of the local governance as province governors focus their efforts on quantity and not quality. Governors rush develop more resources and effort into projects with quick and visible returns, such as infrastructure investments, attracting FDI, and, specific to energy, approving coal-fired power plants. Province government abused their authority to approve coal-fired power plant projects so much that in November 2015, the central government stripped province government of their project approval authority and placed a halt on all coal-fired power plant approvals. Furthermore, strictly GDP based targets has resulted in many problems – province governments prioritizing short-term goals instead of long term planning, "race-to-the bottom" effect. To stand out from his competitors, province governors often also exceed the targets [*chaobiao wancheng*]. In order to look good in the eyes of the center, province governments often fabricate provincial statistics crucial to their performance assessment. This is despite the Statistics Law that was passed in 1983, which stipulated penalties for data fabrication. Yet, the difference between central and local reporting made news in 2013, when the sum of province economic output figures surpassed China's total GDP by a margin of 11 percent (Kao, 2013).

2.5. What drives promotion: GDP?

While the cadre assessment system emphasizes economic growth targets, whether this lead to promotion has been highly debated. Li and Zhou (2004) found that the likelihood of promotion of provincial leaders increases with their economic performance. Likewise, Bo (2016) finds that what really drove up the chances of provincial leaders' promotion was the level of provincial tax

revenue remittance to the center, and that the growth rate of provincial income per capita only facilitated provincial leaders' preservation of their current posts. The latest study by Hsu and Shao (2016) concludes that while economic performance matters, its significance is qualitatively different. Relative provincial growth through vertical comparison – comparing the performance of province governors with that of their predecessors – matters more than before. Provincial leaders up for promotion are evaluated vertically in comparison with the performance cumulative records and then horizontally in comparison with the performance of the leaders of other provinces (Hsu and Shao, 2016). Whether there is empirical evidence that economic performance lead to promotion, this quantitative indicator drives the action of the province governors.

Although political connections and factional politics often play an important role in province leader's promotion, demonstrating policy competence through economic development is still important. Kou and Zhang (2016) find that the rules of promotion are increasingly institutionalized and place considerable restrictions on elite politics. Furthermore, policy competence can make up for a province leaders' lack of political connections. In Jia (2013)'s study, she found that "a one standard deviation increase in [economic] growth raises the probability of promotion by 5.3 percentage points more for connected officials than for unconnected ones". Weakly performing provincial leaders are also unlikely to be promoted irrespective of their connections, while connections increase the likelihood of promotion for strongly-performing provincial leaders (Jia, 2013). Xu (2011) further argues that as most regional party-secretaries were regional governors before becoming party secretary, a precondition for them becoming party secretary was high economic performance when being governor. Policy competence is demonstrated through growing the province economy. Thus,

province leadership is always looking for comparative advantage and new ways of growing their economy. Again, renewable industry is a lucrative option for provinces with capacity.

Overall, this section discussed the political control of the Chinese central government, which Landry (2008) defines as the "design of rules and institutions that effectively constrain the choices of decision makers". The combination of economic decentralization and political control through the personnel management system created institutional limits and incentives to induce loyalty and compliance from province governments. However, it also allows considerable institutional space for variation in adherence. For one, Gong (2009) finds that China's audit system, which checks local agencies and firms are following central directives, allows for significant leeway in implementation, enforcement strategies and outcomes. Thus, it is important to further examine "how provincial leaders shaped their policy agenda, coped with institutional constraints, and attempted to bring about change with a largely hierarchical, Leninist political system" (Cheung, 1998).

2.6. Province Leadership

Within China's decentralized institutions, province leadership becomes very important in the policy implementation process. In particular, the interaction between the leaders and their policy environments, namely how provincial leaders make use of the new and confront the new policy challenges facing their provinces often determine policy outcomes (Chueng, 1998).

2.6.1. Playing the middleman

From the perspective of fragmented authoritarianism, province leadership often plays the middleman, the "active players which involved coordinating, bargaining and mediating with sub provincial units as well as promoting local social and economic development" (Cheung, 1998) They are implementers of central policy but also act as advocates and representative of the provinces. "Such cross-cutting pressures and constraints actually require a delicate act of political leadership and offer both opportunities and challenges for provincial leaders." (Chong, 2000).

Such a structure invariably emphasizes the capability of province leadership to negotiate and form consensus amongst its actors and interests. In actual practice, these bureaucratic dynamics manifest itself into the use of small leadership groups or working groups to implement policies. To many Chinese scholars, these small leadership groups are considered formal institutions which facilitate negotiation and consensus building. Often, the province governor and party-secretary lead these groups and resolve conflicts between bureaucracies.

2.6.2. Dual Role of the Province Governor

What are the considerations of a province governor? Under China's system, where the functions of the party and the government overlap, a province governor is both a governor and a politician. As a governor, his top priority is expanding the province fiscal capacity. This may lead him to short-sighted investment projects in high energy intensity sectors that brings both GDP growth and employment. On the other hand, as a politician, he is finding ways to score political points and therefore look good in the evaluation. This means not just GDP growth, but to for ways to

develop new industry and create new comparative advantage, and use that to ask central government for supportive policies, such as in the area of renewables.

2.6.3. Three Types of Provinces: Pioneering, Bandwagoning, Delaying

Due to the unique institution of fiscal decentralization and political centralization, Chinese provinces behave and respond to the center in a manner that is different from their democratic counterparts; US states that do not approve of the federal Clean Power Plan can delay implementation by suing the Environmental Protection Agency. More progressive states, on the other hand, may set ambitious targets such as going to 100% renewables. Chinese provinces, in contrast, do not overtly oppose central policies. To the extent that local discretion and provincial diversity were emphasized in the overall policy process, the line between regional variation and deliberate delaying becomes increasingly blurred. (Chong, 2016).

Chong (2002) classifies the behavior of provinces into three types: pioneering, bandwagoning, and resisting. Pioneering provinces see their local interests as aligned with the central policy, and therefore will use the opportunity to seize the initiative to push beyond the center's targets. Most provinces would choose to bandwagon – implementing central policies neither too quickly nor too slowly, since both have associated political costs. Last, provinces whose local interests do not align with central policies may resist through delaying policy implementation, for example by being slow to set specific local targets.

2.6.3.1. Pioneering

Pioneering provinces has province leaders who seek to maximize the room for provincial initiative and thus implement central policies much faster than other provinces (Cheung, 1998l; Chung, 2000). It is likely that pioneering localities possess local conditions most favorable to experiment with the central's prosed policy. Cheung (1998) points out that these leaders are far more willing to take risks in order to take advantage of the opportunities made available during central policy shifts and reform. They may initiate and implement policy pilots before there is a comprehensive national plan. Consequently, when the central government searches for solutions to a serious problem, these pioneering provinces can present their pilots as nationally applicable models. In this case, the decision to pioneer is rooted in personal conviction of the provincial leaders and is testimonial to their keen and skillful exploitation of opportunities (Chung, 2000).

Furthermore, because of their ability to take initiatives during central policy shifts, these leaders often establish their own distinct paths of reform or economic development model and are awarded politically for it. The recent example of Bo Xilai and Wang Yang comes to mind as recent examples that received attention. Then party secretaries of Chongqing and Guangdong respectively, both staked their careers into particular models of leadership. In particular, Bo aggressively pushed forward the "Chongqing Model", which brought back populistic sentiments of chairman Mao. Wang, on the other hand, promoted a model of marketization in Guangdong since 2007. Both were able to effectively campaigning for promotion in advance of the 18th Party Congress (Remington, 2015).

A less dramatic example is Henan's successful courting of Foxconn, the world's largest Iphone manufacturer, to set up factory in Zhengzhou city. This deal gave birth to the slogan "Zhengzhou speed" because the process of investment to operation of the factory tool only a month. Of course, this success is attributed to then Henan governor Guo Gengmao. Prior to his term in Henan, Guo was the governor of Hebei, another of Foxconn's core production base. He was thus in close acquaintance with Foxconn's CEO Guo Taiming (Henan Department of Taiwan Affairs, 2011). When Foxconn expressed intentions to move production bases, governor Guo was able to court Foxconn to Henan with huge incentives, including the elimination of corporate taxes for five years, partly finance the construction of manufacturing complex at a cost of $600 million, and provide a discount that reduced the cost of power by 5 percent annually (Barboza, 2016). Despite criticisms about the huge incentive package, the province governor's decision was a strategic one as it plays into Henan's economic development plan to become the central region's logistical hub. Furthermore, since Foxconn had already employed over 150 thousand Henan natives in their Hebei factory complex, moving the factory to Henan provided a lot of convenience for these workers, who were no longer subject to migrant labor policies. Thus, the move was also politically popular (Henan Department of Taiwan Affairs, 2011).

2.6.3.2. Bandwagoning

Bandwagoning provinces have province leaders who choose to operate within the confines of central policies and maintain extreme caution by not implementing central policy too fast or too slow (Cheung, 1998; Chung, 2000). While these province leaders adhere to central directives and push the required policies forward, they do not see massive opportunities and local advantage to

pioneer. Thus, they often choose to implement policies *after* they has been officially promulgated and popularized. For province leaders, this is an opportunistic yet safe options. According to Chung (2010), the historical memory of policy oscillation and punishment induce provinces who want to be in the winning coalition to "wait-and-see" before undertaking reform.

2.6.3.3. Resisting

The third pattern of province behavior is resisting, whereby province leaders perceive reform as a potential threat to local interests would seek to circumvent its diffusion (Cheung, 1998). However, provinces cannot overtly oppose central policies, and instead express non-compliance by the way of either delaying the execution of a given policy and bending it to serve local interests (Cheng, 2000). They may also claim that they are adapting a central policy to local conditions when, in fact its provincial implementation is intended to achieve other goals (Zheng, 2007). Policy makers, therefore, make sure to include the phrase "according to province conditions" when drafting province level implementation strategies of central policies. Provinces would still echo central policy directives by producing province level policy guidelines. Furthermore, guidelines are left purposefully vague, with no implementation details, such as quantitative implementation targets and specification of responsibility distribution. The latter is especially important given the horizontal bureaucratic fragmentation at all levels. The presence of task delegation therefore signifies that consensus amongst various bureaucracies has been reached. All in all, such province behavior calls for a text-analysis based approach to measure province policy compliance.

3. Theory

This paper, the province leadership is specified as the province governor. Although the province party secretary also participates in the major development decisions, economic and social policy are in the province governor's job scope. This thesis theorizes that the governor's commitment towards renewable energy – defined as the strength of renewable ambitions and likelihood of implementation – as the balance between career incentives, province state capacity and existing interests.

3.1. Career incentives

From the literature review, we assume that the promotion mechanism induced province governors to comply with central policies. This is not in the strict sense of following central policy word-for-word, but to be aware of the central's development priorities and therefore areas of huge central policy support. What province governors look for is areas of economic growth that are heavily supported by the central government, so that they can fulfill several goals towards promotion. Firstly, in his role as governor, he looks for policy areas that is able to maximize his fiscal revenue, which in term supports local provision of public services (Wang, 2011). Experimentation in these these policy areas also allows the governor to solicit more preferential policies from the central government in the name of developing strategic industries. If the governor does well, he fulfills his economic performance targets. At the same time, since these policy areas are prioritized by the central government, doing well makes him look good in the eyes of the central government, therefore putting political scores on the table.

As China is going through structural transition of its economy, renewable energy industries have been identified by the central government as "emerging industries" (State Council, 2013) and a "new economic growth point" (State Council, 2013). As the following chapter will show, the central government has given considerable policy support to provinces who are willing to become early adopters. Therefore, the area of sustainable development has become one in which many province governors want to make their provinces pioneers.

Furthermore, adopting renewable energy makes province leaders look good. Province governments can use clean energy adoption to distinguish themselves to showcase their policy entrepreneurship and skills at forging coalition. Given the increased awareness of pollution issues, sustainable and green development is in vogue. Provinces that have high adoption often use renewables as part of their economic development strategy "with province characteristics". For example, Shandong province has established "an international reputation for being hotbeds for solar water heating (SWH) technology development and dissemination" (Goess et al., 2015). Despite the dominance of coal SOEs, the Shandong province government was able to support private solar corporations and develop an entire industry surrounding solar. Likewise, by pioneering in large-scale solar farm installation, Gansu province was able to claim pioneering status in the solar industry. It even hosted international conferences for other province leaders and 13 leaders of foreign countries to learn from the "Gansu model".

There is qualitative evidence that province leaders who promote renewable energy are rewarded politically. Recognition by central provinces may come in the form of feature articles in central state newspapers, invitation to forums, and showcasing their province success stories at

international conventions. Awards for pioneering individuals are also issued to those who have made the most contribution in advancing renewables (Inner Mongolia Development and Reform Commission, 2009). Furthermore, pioneering provinces may be granted with visits by Politburo members. For example, Premier Li Keqiang, together with National Development and Reform Commission director, National Energy Administration top representatives and CEO of State Grid Company, visited Inner Mongolia's wind farm in 2014 (China Energy Report, 2014). The visit concluded with State Grid Company committing to building transmission line. In 2016, Inner Mongolia's governor, Wang Jun, was promoted to Central Committee membership.

3.2. State capacity

There has been a substantial literature that seeks to understand state capacity. Feng summarized the view of Alexandar Gerschenkron and Barring Moore: "to succeed in international competition, growth-oriented developing countries must depend on strong government that can allocate and distribute resources effectively". Thus, state capacity is a function of the economic and political structures of individual states vis-à-vis the would economy. Another view of state capacity is from Max Weber (1947), who identified domestic explanation of state capacity in the modern bureaucratic state. Robert Wade (1990) and Stephan Haggard and Robert Kaufman (1992) have emphasized bureaucratic quality and competence in explaining economic adjustment and growth.

The most ambitious work to date to quantify state capacity is that by A.F.K. Organski and Jacek Kugler (1980), which argues that "more fiscal capacity is more capable and effective generally".

Following Tucker and Lewis's 2015 paper on policy non-compliance, this thesis defines province state capacity as their authority over local taxes and resource allocation. I argue that high state capacity enables province governors to enforce compliance. This capacity varies depending on a province's ability and willingness to extract taxes from local industries and the extent to which central regulatory structures supersede local institutional authority. While provinces vary in their institutional autonomy, high state capacity can also make the difference in better regulation (Tucker and Lewis, 2015).

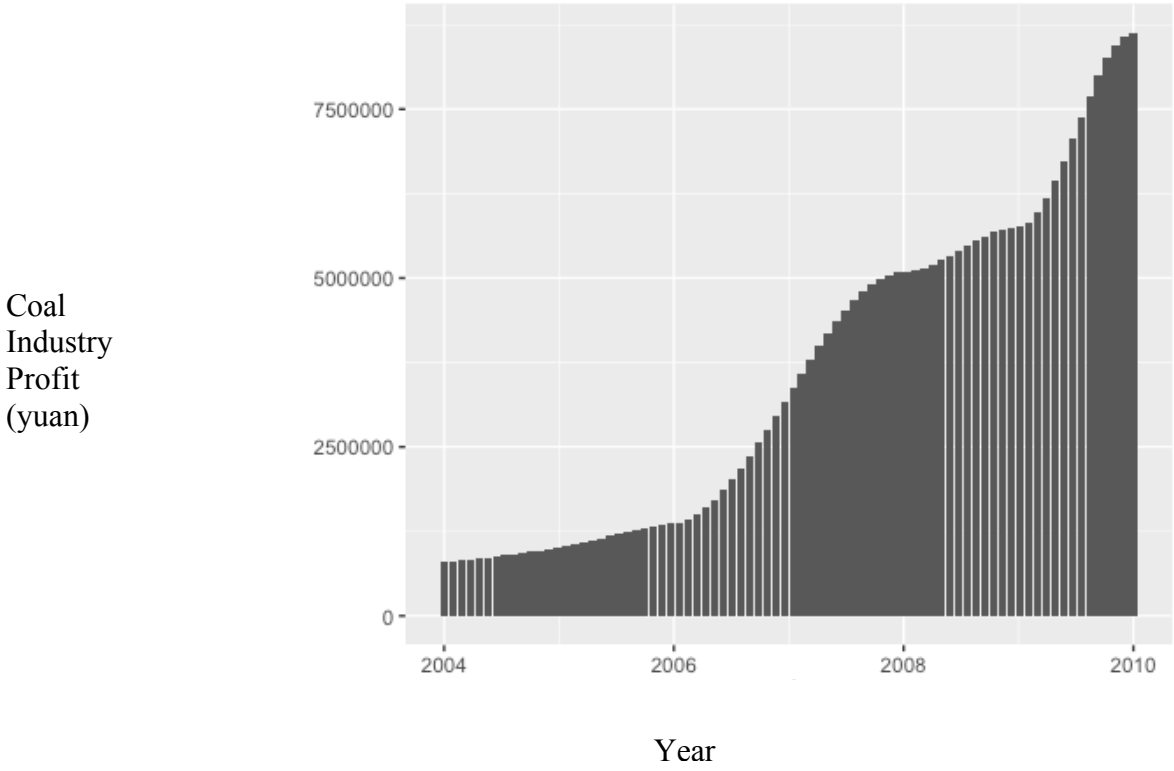
Defining state capacity as the province governor's authority over taxation and resource allocation makes sense for China, since its central-local relations are governed largely fiscal decentralization. The province government's main apparatus to attract wind generation investors is the provide generous tax cuts and help wind investors navigate through local bureaucracies (Yu, 2000). In the study of energy efficiency policy, Kosta and Hobbs (2012) found that Shanxi province used its own provincial funds to finance local efficiency projects. In particular, the "Coal Sustainable Development Fund" was created through taxation of al provincial coal exports and a part of this money was used to fund energy saving initiatives.

3.3. Existing interests

It follows from path dependence theory that the current choices and decisions of the province governor are limited by existing and past institutions. Low-carbon reform becomes difficult when there is resistance from current local interests. Zhao et al. (2016) found that the employment of renewables affects vested interests in the system. One interest group that

province governors are particularly concerned about is the coal industry. Coal has fueled China's economic development for the past 3 decades, and existing institutions prioritize coal interests in multiple ways and provinces are also dependent on coal groups. Firstly, province governors receive enormous tax revenue and other benefits from the coal interests. Although data on how much tax from coal industry is not available, I have obtained data on coal profit (in 10, 000 yuan) from 2004- 2010 for selected provinces. Figure 1 shows a histogram of total coal sector profit from 2004-2010. As seen, coal industry – from mining to generation – contributes significantly to province economic development. Northern China is illustrative of this interest. The historical industrial hub of China has implemented policies that prioritize coal fired power generation. This is partly because province government receive more in taxation from coal State-Owned Enterprises (SOEs). In Jilin province, a 20-year lifetime wind farm can provide total of 564.87 million yuan in taxation whereas a coal-fired thermal power plant of the same capacity and lifetime can provide 895.51 million yuan in taxation. (Zhao et al., 2013). Province governors looking to maximize government revenue would prioritize current coal industry interest, which will lead to lackluster interest in developing renewables.

Figure 1: Coal Industry Profit in Selected Provinces (2004-2012)



Source: Various province level statistical yearbooks, from China Statistical Yearbooks Database, China National Knowledge Infrastructure.

In the next section, I apply this theory to China's renewable energy development.

4. China's Renewable Energy Development

Renewable energy development in China is a vital part of China's energy reform. Although China has made great strides in reducing coal consumption, fossil fuel still accounts for around 68% of China's total energy consumption in 2014 (BP World Energy Report, 2015). The detrimental impacts of a coal-based energy system have been widely reported and recognized. In 2006, China surpassed the United States to become the world's largest emitter of carbon dioxide and alone accounts for about 25% of global total emission (World Resource Institute, 2015).

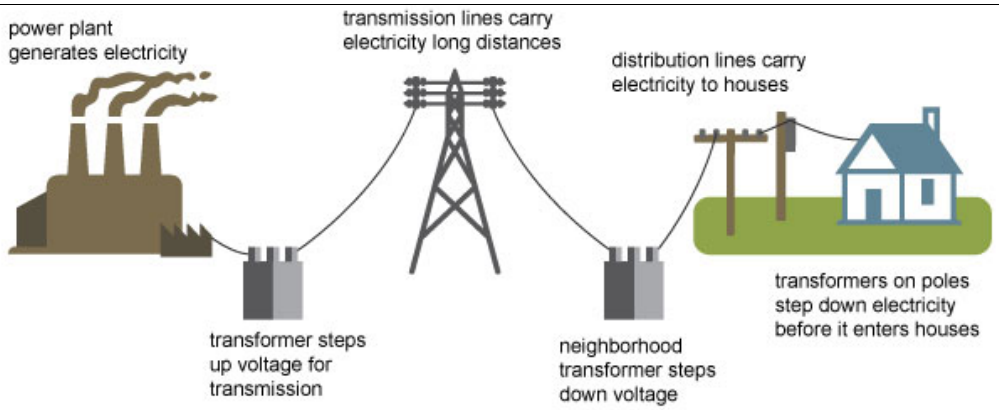
Furthermore, China's energy sector contributes to about 66% of its emissions (World Resource Institute, 2015). China also had its fair share of heavy air pollution. Thus, in order to mitigate these effects, China needs to transition into a low-carbon energy system and develop renewable energy as the alternative to coal and other fossil fuels.

As such, the perspective on renewable energy policy support is essential because international experience shows that policies have been pivotal in renewable energy development (Lewis, 2007; Lema and Ruby, 2007). In the study of global wind policies, Lewis (2013) found that in countries with successful wind power implementation have proactive government support. In the two most successful countries, Germany and Denmark, policies targeted stable market development simultaneously with technological push and financial incentives (Lewis 2013). This requires coordination of the part of the policy makers. Prior to 2000, China's renewable energy development was incremental as the energy authorities were in dispute over the strategy and launched conflicting policy initiatives with poor results in wind energy output. Lema and Ruby (2007) finds that from 2000 onward, the central government developed a coherent renewable energy agenda and policy regime for the wind power sector. It is found that this phase with coordinated market regulations and incentives has helped give birth to a take-off in Chinese wind energy installations and substantial cost reductions. With the passing of the Renewable Energy Law, China further accelerated its renewable energy adoption. As such, China's wind energy capacity has surpassed that of the US. In 2013, six out of the world's top-ten solar PV manufacturers were located in China, compared with only one U.S. firm.

4.1. Major Actors

Renewable energy development is embedded in the larger energy and electricity sector. Figure 2 gives an overview of China's electricity sector, the main government functions within each sub-sector, the actors. The electricity sector comprises primarily of three sub-sectors – generation, transmission, and distribution. There are a wide variety of policy pathways within this complex structure to increase the demand and supply for renewables and reduce demand and supply for coal. Within this structure, there are institutional constraints and entrenched interests that make the entry of renewable difficult. Nevertheless, there are considerable policy spaces for pilots and innovations. This also explains the different trajectories of wind and solar energy in China.

Table 2: The Chinese Electricity Sector



Sub-sector	Generation	Transmission	Distribution
	Electricity is generated at various kinds of power plants, including coal and renewable sources. Electricity is increased to high voltage at transformer to be transmitted.	Transmission lines carry electricity at high voltage over long distances from power plants to communities.	Electricity from transmission lines is reduced to lower voltage at neighborhood transformer and then power is brought to homes and workplaces.
Function	• Capacity building • Generation Price	• Dispatch • Area coordination	• Distribution of energy • Renewable energy promotion
Actors	• Central government* • Province government* • Generation companies	• Central government* • Province government* • Grid companies • Generation companies	• Central government • Province government
Policies	• Renewable Energy Law • Decision About the Healthy Development of Solar Industry	• Circular on the Improvement of the Wind Power Feed-in-tariff Policy	• Decision to support New Energy Vehicle Industry • New Energy City Pilots • Low-carbon City Pilots

Sources: Image adapted from U.S. Energy Information Administration. Table dapted form Davidson et al. (2016)
Notes: *Denotes primary responsibility

4.2. Wind energy and solar energy development

China's endeavor to seek more renewable energy sources started with the 8th Five Year Plan, when the central government declared that it supported the building of wind farms. Very early wind projects adopted learning strategies from developed countries, such as the USA, Denmark, and Norway. Most projects used central government development assistance and loans from foreign governments. In fact, China's first wind power generation plant connected to the power grid was a joint project with core wind power generation system imported from Vestas of Denmark (Wang, 2009). Lema and Ruby (2007) calls this period the "fast-track" development stage, whereby China was primarily concerned with increasing renewable generation capacity at a fast pace. Thus, projects simply used the most cost-effective technology, which are often foreign imports. The second stage of "slow-track" development started around 2009, whereby the government paid more attention to developing local manufacturing capacity and cultivated local wind manufactures. Lewis (2007) finds that China's policy support enabled China's wind manufacturers to be competitive globally. As such, two Chinese wind companies, Goldwind and United Power, are currently amongst the world's top ten wind turbine suppliers (Energy Digital, 2015).

In contrast, China's solar energy policies initially were not geared toward domestic deployment. Rather, the decision of European governments to adopt solar energy policies created new demand for solar panels. Chinese manufacturers, aided by export-oriented economic policies, seized the opportunity, becoming the dominant global suppliers of solar PV within a five-year span. Even as individual companies like Trina Solar became global leaders, hundreds of smaller

enterprises flooded the market. Around 2009–2010, however, imbalances started to appear. Excess production of renewable energy equipment, combined with reduced solar subsidies and aggressive trade remedies by trade partners, disincentivized solar PV exports. Domestically, many wind farms were underutilized. This situation prompted the Chinese government to pursue a "rebalancing" policy, characterized foremost by a shift in domestic deployment toward the solar sector. Solar capacity subsequently grew by 193.8 percent year-on-year, compared to 19.7 percent growth for wind capacity (REN21, 2014). According to the estimated cumulative figures provided by REN21, China by 2014 ranked second in installed solar capacity behind only Germany.

The comparison between China's wind and solar energy development illustrates that there are multiple pathways to supporting the renewable energy industry. This means that provinces, even varying in resources and developmental strategies, have considerable policy innovation space to incorporate renewable energy development into their development strategies. Provinces with fewer renewable resources can nonetheless choose to build demand for renewable energy. In 2016, Shanghai became the number 1 city in the world for ownership of new energy vehicles (Fan, 2016). One of the more creative policies implemented recently is to issue special license plates for new energy vehicles (China Daily, 2016). Furthermore, the central government has provided various incentives to province governments, according to my theory on what affects local implementation.

4.3. Incentivizing Province Governments

How does Beijing translate its long-term national strategies into policies and signal its shift in priority?

4.3.1. Political Incentives

Province governors who seek to maximize their chance of promotion should look to the central government signals of shifts in national strategies and developmental priorities. Indeed, renewable energy has become one of the important long-term economic development strategy of the central government. Province governments benefit from development in these prioritized industries because there is considerable fiscal support and there are political points to be gained.

Politically, there have been many instances of central government leaders pushing for renewable energy in China. At the 2009 World Economic Forum, China's then premier Wen Jiabao announced that "China will accelerate the development of a low-carbon economy and green economy so as to gain an advantageous position in international industrial competition" (Ministry of Foreign Affairs, 2009). President Xi Jinping has been active in the international effort to combat climate change. In 2014, in a historic US-China joint climate agreement, China announced ambitious targets to reduce carbon emissions and increase the share of non-fossil fuel to 20% of China's primary energy mix. This further solidified the central government's long-term strategic priorities.

One important way for central government to signal changes to national priorities is through the Five Year Plans (FYP). Until the 10th Five Year Plan, China's development model emphasized

fast, “develop first, clean up later” economic growth, heeding Deng Xiaoping’s slogan that “getting rich is glorious”. This is then reflected in the economic policies in the 10th FYP (2000 - 2005) that emphasized market reform, globalization through the “going out” strategy. However, as social problems of inequality begin to surface, we see major changes to specify and prioritize their national targets in the 11th Five Year Plan (2006-2011). “Getting rich first” was replaced with “common prosperity” and “harmonious society.” It was in the 11th FYP that environmental targets increased in national priority.

Previously, in the 10th Five Year Plan, the main targets were given in five paragraphs, each covering targets on macroeconomic, restructuring of the economy, technology and education development, sustainable development, and social issues. With the 11th FYP, as shown below, a table was employed to group 22 targets into categories and assign priority to these targets. The categories are “Economic Growth”, “Structure of Economy”, “Population, Resources, and Environment”, and “Public Service and People’s Livelihood”. The most important change here is the last column, which specified if a particular target was “hard” or “soft”. The 11th FYP further provided a legend for the target categorization to clearly define the responsibilities for implementation of the plan.

Soft Targets. Marked as “expected targets”, these “are development targets that the nation aims for, and should be achieved through the discretionary behavior of the market. The government should create favorable macro-economic, policy, and market environments, occasionally making macro adjustments, and holistically utilize various policy guidance and resource allocation, in order work hard to achieve these targets.”

Hard Targets. “restricted targets are targets that further specifies and strengthens government’s responsibility in public service and commitment to the people. They are the central government’s requirements of province and local governments and bureaucracies. The government need to use the allocation of public resources and effective utilization of administrative power, with clearly defined work responsibility and planned schedule, to ensure the accomplishment of these targets.” (Feng, 2010)

Subsequently, the 12th Five Year Plan included binding targets for non-fossil fuel – increase non-fossil fuel usage in primary energy consumption to 11.4%. Although GDP targets will still be taken seriously as an “expected” target, this specification elevated environmental goals to at least the same level as economic goals.

4.3.1.1. Inducing province competition and local experimentation

Another way for central government to encourage province implementation and competition through supporting or mandating regional pilots. Since the 12th Five Year Plan, the central government initiates competitive regional pilot schemes to foster local entrepreneurship for policy innovation and experimentation in low-carbon transition, and to promote the diffusion of innovative local policies at the national level (Qi, 2014). The most significant renewable energy pilot is the recent emissions trading scheme pilot (ETS), which internalized the social cost of coal and thus made renewables more competitive. One important pilot Wind and solar PV cannot compete with the low cost of coal power generation, based on today’s market prices. They do

become cost-competitive, however, when accounting for coal's significant externalities, such as air pollution and its impact on human health (IRENA, 2014; Liu and Kokko, y2007). Coal-fired power plants "will always choose higher than socially desirable emission levels if by doing so they can increase their profits" (Zhao, 2017). As such, "in the absence of environmental regulation, the external environmental cost is not the decision-making factor that producers consider, i.e., the cost of emission is zero" (Zhao, 2017). Given this case of market failure, it is therefore important for governments to intervene in the market through policies and incentive to avoid the undersupply of renewables. The ETS pilot is seen as a huge success. Again, these pilots provide an avenue for provinces to become policy entrepreneurs and to be politically rewarded for these efforts.

4.3.2. Budgetary and Economic Incentives

The second way the central government induces policy compliance is to provide policy and fiscal support for developing renewable energy. Table 3 lists the major central renewable policies that were passed from 2000 to 2015.

Table 3: Major National Renewable Energy Policies and Laws

Year	Policy
2005	Renewable Energy Law of the People's Republic of China
2006	Renewable energy generation management and regulation
2007	Medium-and-long Term Development Plan for Renewable Energy
2009	Renewable Energy Law of the People's Republic of China (Amendment)
2010	Decision of the State Council for Accelerating the Fostering and Development of Strategic Emerging Industries
2011	Interim Measures for the Administration of the Collection and Use of the Renewable Energy Development Fund
2012	Development Plan for National Strategic Emerging Industries During the 12th Five Year Planning Period

2013	Circular on Adjusting the Standards for Surcharge on Renewable Electricity and Matters Relating to Tariffs on Eco-friendly Electricity

Sources: various government websites

All of the policies above provided direct fiscal incentives for the implementation of renewable energy and/or opportunities to apply for major projects. The Renewable Energy Law in 2005, which set specific mechanism to enhance the adoption of renewable energy capacity nationwide. The law stated that renewable energy development and utilization would be treated as a priority area for energy development (National People's Congress, 2005). Thus, the Renewable Energy Law sought to ensure both stable supply and demand. The law was further renewed in 2009 to include a renewable power quota system and a priority dispatch system that favors renewable electricity (Qiu and Lin, 2012). It also further delineated responsibilities for implementation. Importantly, a special fund was set up to address the problem of extra costs of renewable energy production, and they provide subsidies and other forms of financial support to some renewable energy projects whose cost cannot be fully allocated to all market players. It has since funded 23 province level projects.

The 2006 "Renewable energy generation management and regulation" also gave province government more autonomy to develop province level wind policies. Article 6 specifies that NDRC will reserve authority to evaluate and approve wind power generation projects of capacity above 50 thousand kilowatts (NDRC, 2006). More importantly, the document gave the authority to approve projects below said capacity to the province government. As for solar, biomass and geothermal projects, the NDRC will evaluate and approve those that needs central government policy and financial support (NDRC, 2006).

4.4. Province Responses

Given the consideration of the province interests discussed in section three, province governors have incentives to develop renewable energy. This can bring direct benefits, including government revenue through taxation, diversification of economy, development of auxiliary and up-stream industries. Most importantly, under the current central government policy support. In an interview with Inner Mongolia official, Wang (2011) found that province officials consider developing renewables as being "significant in advancing promotion". In addition, there are long-term benefits to renewable energy development. As the central government looks to expand the scale of renewable electricity adoption, renewable energy industrial bases can enjoy special policies and become major actors in the future renewable electricity markets.

Consequently, provinces have been rather responsive. In 2006, Gansu province volunteered to host large wind bases which later obtained NDRC approval (Davidson et al. 2016). Gansu also gave tremendous value-added tax cuts to wind developers (Yu, 2000). Many provinces also experience "solar fever" [*guangfure*], as provinces competed for central subsidies to solar PV projects (Interview with Henan Development and Reform Commission, 2015). While there are anecdotal evidences of province compliance, there have not been any systematic studies. Thus, the next section attempts to quantitatively analyze the effects of career incentives, province state capacity, and vested interest on renewable energy compliance.

5. Research Design: Commitment to Renewable Index

5.1. The Model

In the study of renewable energy capacity in the United States, numerous studies have employed fixed-effect models to examine the impact of state-level renewable energy policies on renewable capacities in the United States (Carley, 2009; Sarzynski and Sharimali, 2012; Shrimali and Jenner, 2013; Zhang et al., 2016). This thesis follows their example by employing a fixed-effect regression model to account for unobserved province-level and time variation. A Hausman test was performed and a p-value of 1.258×10^{-5} and thus a fixed-effect model was chosen over a random effect model.

The model is presented as

$$Commitment\ Index_{p,t} =$$

$$\beta_0 + \beta_1 Career\ Incentive_{p,t} + \beta_2 Province\ Capacity_{p,t} + \beta_3 Vested\ Interests_{p,t} + \varepsilon_{p,t}$$

5.2. Dependent Variable: Commitment to Renewable Index

This thesis explores a new approach for analyzing the dynamics of China's energy transition from an energy-intensive development strategy relying on coal and other fossil fuels to a much more environmentally-benign model based on the use of renewable energy sources. The thesis takes advantage of province-level variation in policy intent and ambition, and develops a summary indicator for commitment to renewable energy development. Instead of evaluating the success of renewable policies purely on deployment, i.e. installed capacity, I analyze the policies

themselves and their capacity for long-term success. This is done through evaluating how committed provincial governments are to renewable-oriented policies, based on criteria that are sensitive to China's political dynamics.

Level of policy commitment is measured by: 1) strength of renewable ambitions and 2) likelihood of policy implementation. A province that sees renewable development as a competitive advantage is expected to set more ambitious targets. Thus, the extent to which a province is willing to prioritize renewable development as part of its overall economic strategy is important. As discussed in section 3, the problem of the implementation gap is particularly severe is China, especially when central and province incentives do not align. Provinces, unable to directly oppose central policies, often choose to delay implementation and set vague targets. This reluctance can be seen from the lack of specific deliverables from the policies – such as increased capacity targets and task delegation.

Defining commitment in terms of ambition and implementation has many advantages over more conventional indicators. The simplest and most widely used indicator to assess the effectiveness of renewable energy policies is installed capacity. However, taken alone, installed capacity does not provide any indication of actual utilization. By the end of 2015, China has already exceeded its 2020 wind installation target by 400% and presently accounts for 33.6% of total global installed wind capacity (Xu et al., 2016). The US, in second place, accounts for 17.2% (Global Wind Energy Council, 2016). Yet, despite greater total installed capacity, the actual wind-generated electricity output in China is less than in the US (Xu et al., 2016). The alternative to

installed capacity is to use electricity generation as an indicator. However, this does not reflect intent nor ambition of policies (IRENA, 2014).

To resolve these problems, a small literature has emerged to develop a set of increasingly sophisticated indicators for evaluating renewable energy policies. (European Commission, 2005; IEA, 2008; Held, et al., 2010; IEA, 2016). These include the European Commission effectiveness indicator, the Policy Impact indicator, and the Deployment Status Indicator (IEA, 2016). However, these indicators are essentially more elaborate ways of measuring renewable energy deployment, and stops short of assessing policy intent, ambition, and likelihood of implementation. Given the Chinese central-province policy implementation dynamics, these indicators cannot tell us whether a province is pioneering, bandwagoning, or delaying renewable policy implementation.

Given the challenges above, IEA (2016) argues that we need to turn our focus to evaluating policies. However, given China's central-province dynamics, it is not possible to follow the methodology used for analyses of US state policies. A binary 0 (policy not implemented) and 1 (policy implemented) cannot be used in Chinese policy analysis because the mechanism of resistance is through policy delay rather than overt non-compliance. Thus, it is necessary to analyze the policy documents. While the documents in themselves cannot reveal the extent to which policy measures are being effectively implemented, the content analysis can provide a very useful meta-analysis of trends in the importance attached to renewable policy in specific provinces (Xibing Huang, 2010). Currently, text analysis on renewable energy is commonly used to identify policy variation. Liao (2016) analyzed 76 national level wind policies while Yang and

Zhang (2015) produced similar work on solar policies. Both papers classified policies by type and issuing agency. While informative, these analyses do not tell us whether these policy papers will be implemented, how aggressive the targets are, nor how it may affect China's renewable energy development. Thus, there is a need to develop better indicators, which this thesis seeks to do.

Another advantage of defining province policy as the dependent variable is to avoid threats to validity. In Cao et al. (2016), the authors found that coal production was positively associated with wind installed capacities. They found that a one percent increase in per capita coal production is expected to be associated with a 0.113 to 0.419 per cent increase in wind installed capacities (Cao et al., 2016). As China's economic growth slows, provinces that are economically dependent on the coal industry are facing severe problems of overcapacity. Many province level coal SOEs are facing bankruptcy. Thus, as a province government looks for new energy sources and industries, renewable energy becomes the natural choice. However, more likely, the results by Cao et al. (2016) may be due to the geographical distribution of China's natural resources. The provinces that have the highest coal reserves are also the provinces with the highest wind and solar potentials. We therefore expect these provinces to have high renewable adoption. Thus, this paper scores policies instead of deployment.

5.3. Components of the Index

The Commitment to Renewables Index scores a summation of relevant province policies by their commitment to renewable energy development. I collected and scored province policies from

2000 – 2015, which covers the 10th, 11th and 12th Five Year Plan (FYP) periods. Although the central government started incorporating wind energy development in the national strategy as early as the 8th FYP, these efforts were fragmented and subjected to bureaucratic conflicts (Liu and Kokko, 2007). It was not until the 10th Five Year Plan that the center consolidated its national renewable energy strategy. All 30 provinces will be included in the data gathering, including 4 municipalities (Beijing, Shanghai, Tianjin and Chongqing) and five autonomous regions (Inner Mongolia, Guangxi, Tibet, Ningxia and Xinjiang), which are treated as provinces.

Five Year Plans. I assume that a province's decision to develop renewable energy is endogenous to its overall economic development strategy. Furthermore, China has adopted the "slow-track approach" (Lema and Ruby, 2007) to developing renewables, which means fostering local manufacturing, while increasing capacity. Thus, it is important to include the Five Year Plans to determine that renewables are part of the province's overall economic development.

Energy Five Year Plans. In addition to policies targeting wind energy development, provinces have also developed strategies for overall energy development by adopting specific Energy Development Plans as part of their overall provincial Five Year Plans. Since the energy plan needs to account for the overall province energy development, its details can be very revealing of the relative standing of renewable sources vis-à-vis coal sources.

Province Wind Policies and Solar Policies. Province level renewable energy policies play significant roles in stimulating renewable development. While energy FYPs cover a broader spectrum of energy sources, policies for specific renewable sources will have a larger positive

impact than general energy plans on wind power deployment. Data on wind policies is obtained from Zhang et al., which collects policies from 2000 to 2012. I further update this data by searching through government sources. Data on solar energy is obtained from the National Energy Administration, which published a report of province level solar data in 2014.

Reduction of Coal. The most effective way to make renewables competitive is to internalize the cost of negative externalities from coal burning. Thus, the seven provinces that participated in the Emissions Trading Scheme pilot are awarded five points each.

Discount factor. This paper also accounts for province policies that are detrimental to the growth of renewable energy. One reason for the utilization gap mentioned above is the curtailment of renewable energy – renewable energy not utilized due to lack of transmission access. In the first seven months of 2016, aggregate wind power curtailment across China grew to 32.3 billion kWh (Liu, 2016), which is enough to power the entire United State for about 3 days. The sub-optimal performance of wind and solar farms not only "harms the profitability of existing wind investments, but also reduces the economic attractiveness of future investments." (Xu et al., 2016). This thesis uses data on percentage renewable produced (minus) percentage renewable consumed as a simple indicator for curtailment. We also found several provinces, such as Yunnan, that have policies that favor coal. 3 points are subtracted for these provinces as well.

5.4. Scoring Criteria

Table 4: Scoring Criteria for Commitment to Renewable Index

Dimensions	Indicators	Point	Justification
Strength of Renewable Ambitions	Slogans	2	Province governors often echo the central government's slogans and priorities to express their compliance with central policy. They would also innovate beyond the central slogan to express initiatives. Thus, province leadership who put thought into incorporating energy into their slogan, such as Shanghai's "green competitive advantage" or Henan's "critical battle against pollution" are awarded 2 points per slogan.
	Renewable as overall Economic Strategy	1-2	As provinces are first and foremost concerned about economic development. Thus, governors who are able to incorporate renewables into their economic development are awarded. 1 point for purely mentioning pursuit of renewables as "emerging industry" (paying lip service) and 2 points for detailing specific strategies, such as developing renewable technology sector.
	Renewable Industry focus	1-2	Pure mentioning of intention to develop a specific renewable sector gets 1 point. If a province specifies strategies to develop the sector – improving grid connection, increasing capacity – 2 points are awarded.
	Renewable as low-carbon strategy	1-2	1 point is awarded for mentioning renewables and 2 points for further elaboration.
Likelihood of Implementation	Targets	2	Making a target public ties the province governor to it and makes him accountable. The score is given for the duration of the years that the policy covers.
	Specific Pilot Sites	2	"Experimentation under hierarchy" is a mature governance practice in China whereby province governors can initiate pilot projects to express policy entrepreneurship. The presence of renewable related pilot shows innovation and initiative on the part of the governor.
	Specific Actors	2	The ability to incorporate other actors and create new beneficiaries of renewable policies reflects political astuteness and thus should be acknowledged. For example, some provinces have specified the private sector players that they are

		collaborating with to implement their renewable strategies. Shandong, for example, listed 6 automobile manufacturers that are involved with the province's new electricity car pilots.
Assignment of Tasks	2	This indicator takes into account the fragmented authoritarianism aspect of Chinese political system. Having specific allocation of tasks to individual bureaucracies indicates the governors' ability to resolve inter-departmental conflicts and reach consensus through negotiation.
Evaluation	2	This indicator gets at whether there are teeth to enforcement. Many provinces mentions the strengthening of environmental performance targets.

To ensure inter-coder reliability, my research assistant and I scored 10 province FYPs together and followed the scoring system strictly. The score system is also designed to minimize subjectivity of the coder. The only scoring that may vary is in the scoring of slogans. Some slogans such as "Green Revolution" and "search for green competitive advantage" may indicate more ambition than "pursue low-carbon development". However, in order to minimize subjective judgment, we have decided to award all slogans a score of 2.

5.5. Independent Variables: Career Incentives, Province capacity, Economic Interests

For career incentive, this thesis uses province governors' age as an indicator. Due to the strict implementation of official retirement age, studies have found that age is strongly correlated with Chinese official's career incentive (Persson and Zhuravskaya, 2014; Cao et al., 2016). In China, the age limit for officials is taken very seriously and a 65 years old mandatory retirement rule was implemented nationwide in 1985 (Persson and Zhuravskaya, 2014). Furthermore, since early 2000, no provincial leader has avoided retirement within six months after turning 65, unless they

hold a national leadership position simultaneously (Cao et al., 2016; Persson and Zhuravskaya, 2014). I therefore expect province leaders to have the most ambition for career advancement as they approach their early 60s. If they are promoted to central government positions before 65, they can avoid mandatory retirement.

For province capacity, this thesis uses province tax revenue as a percentage of GRP as an indicator. This is a commonly used approach (Feng, 2006; Tucker and Lewis, 2015) to capture province government's ability to extract from and administer firms. This also captures the government's ability to provide incentives for private sector by reducing tax burdens (Koksta and Hobbs, 2012).

For vested interests, this thesis uses SOE employment as a percentage of total province employment and GRP per capita. Resistance from the coal industry is best captured by the number of workers employed by the coal sector. This is arguably more important than the revenue from the coal sector, since China has been suffering from overcapacity of coal production. Consequently, province governments keep unprofitable coal-fired power plants running to avoid social instability from unemployed workers. However, province level coal industry employment data is only available for 2005-2008. Thus, this paper use SOE employment data as a proxy for coal sector employment.

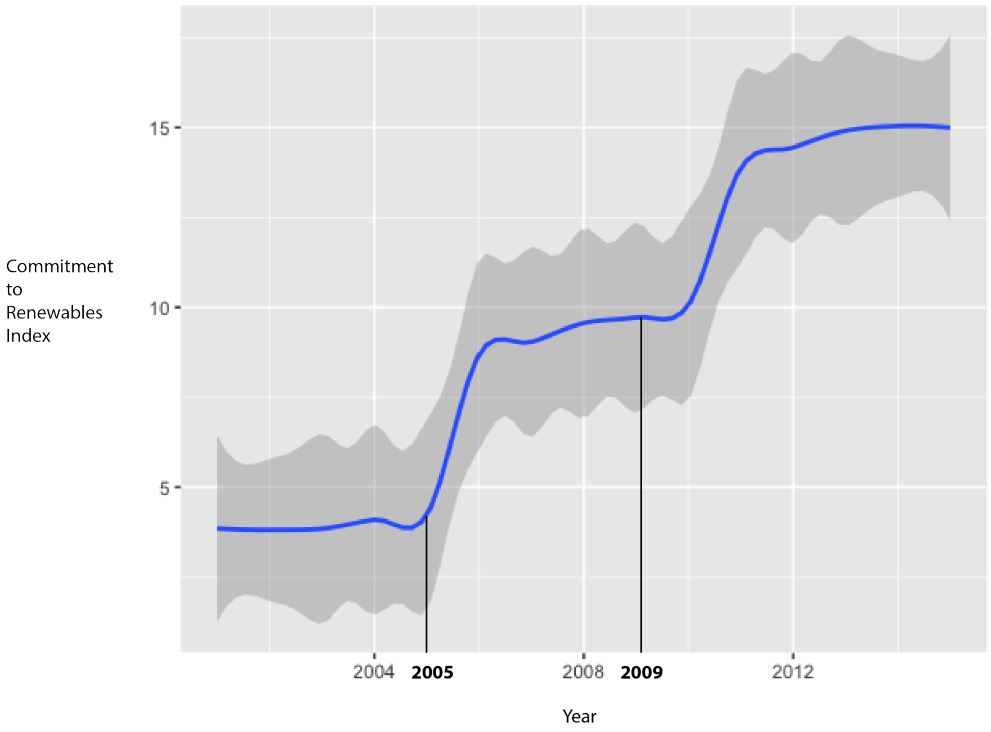
This paper also controls for province population (population) and economy (GRP per capita).

6. Results and Discussion

6.1. Commitment to Renewable Energy

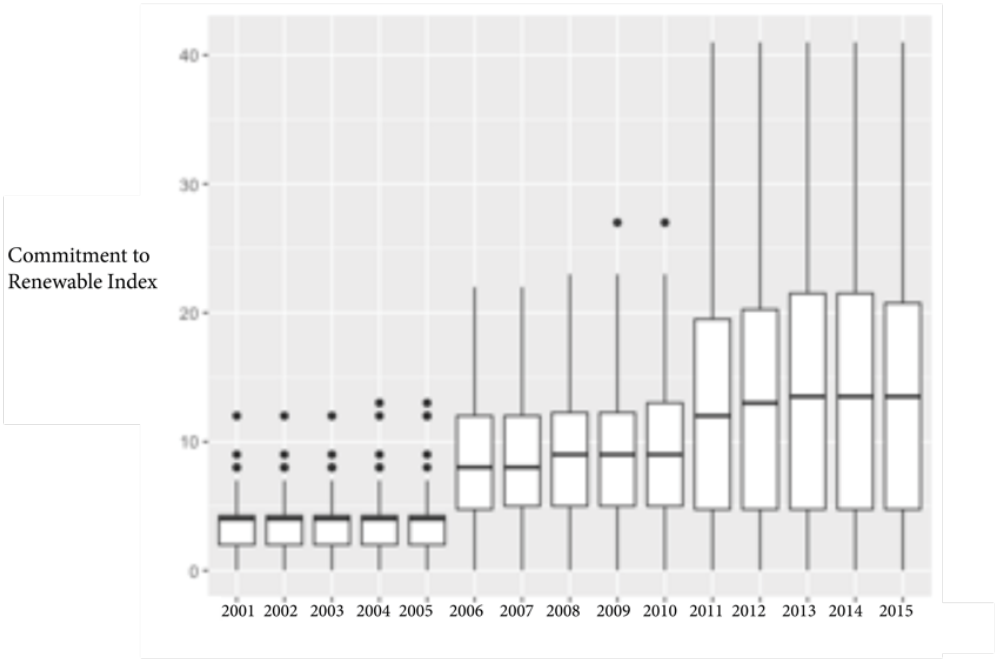
In general, the trend shown in Figure 2 shows that all provinces have followed the central government's directive to increase their commitment to renewable energy. I use a smooth conditional distribution function for Figure 2 which estimates the mean conditional on the number of local observations. This model reduces the estimation bias (Hansen, 2004). The blue line indicates the conditional mean of the Commitment to Renewable Index variable while the grey are the upper and lower limits of the 95 percent confidence interval. There is a clear spike in province commitment around 2006 and 2010, which corresponds with the passing of the Renewable Energy Law in 2005 and its significant revision in 2009. This indicates that province governments are particularly responsive to specific policy incentives given by the central government. This is in line with my argument that province governors are always looking for new industries to compete in, grow their economy, and be awarded politically. This also shows that the current institutions are effective in inducing policy compliance in general.

Figure 2: Chinese Provinces' Commitment to Renewables Policies



Furthermore, Figure 3 confirms that, despite general trend of compliance, provinces respond differently to central directives. Over the years, the variation in provinces commitment increased as some provinces made renewable energy development their primary growth strategy while others merely fulfilled the bottom-line requirements.

Figure 3: Variation in Chinese Provinces' Commitment to Renewables Policies



6.1. Discussion of the model

Table 5: Fixed Effect model of drivers of renewable energy commitment

Variables	Coefficient	Standard Errors
Career Incentive	4.605*	2.296
State Capacity	10.823***	1.207
Vested Interests	- 0.0238	0.031
GRP per capita	-0.00208	0.00736
Population (10000ml)	-0.117*	0.0566
Adjusted R-squared	0.53445	

** $p < 0.05$; *** $p < 0.01$

In this model, both the variables for career incentive (governor's age) and state capacity (tax revenue as percentage GRP) are significant, while economic interest is not. As governor's age increase by 1 year, his commitment to renewable energy increases by 4.6 points, holding everything else constant. State capacity is also significant. As the percentage of tax revenue

increases by 1 percent, commitment to renewable energy increases by 10 point. This shows that fiscal incentives are important to province governor's decision to commit to renewable energy. The relationship between vested interest (state-owned enterprise employment) and commitment to renewable is expected. Commitment to renewable energy increases as SOE interests decrease. However, this variable is not significant.

6.2. Illustration: Inner Mongolia vs. Xinjiang

Inner Mongolia was the first province to issue a comprehensive set of provincial policies to supplement the national wind power policy framework and can be seen as a best practice example of provincial initiatives (Liu and Kekko, 2012). This achievement is even more commendable given that Inner Mongolia is also economically dependent on the coal industry. This advancement in wind development can partly be explained by the career incentive of the province leaders. Given strong central government support, wind deployment has received "priority attention" from province party secretary, who "personally participated in province wind industry planning (Inner Mongolia Development and Reform Commission, 2009)". Inner Mongolia's five-year development from specified targets, and supporting policies to grow auxiliary industry around wind farms. Consequently, in 2006, the provincial government issued a ''Regulation for Inner Mongolia's Wind Energy Resource Development and Utilization.'' This included regulations on wind power development planning, detailed investigations of wind energy resources, and feasibility studies for projects in Inner Mongolia. During the same year, the provincial government also issued a document entitled ''Further Regulation for Strengthening Regional Wind Energy Development, and Utilization, Management, and

Implementation of Wind Power Projects,'' which defines the allocation of provincial resources for wind power, specifies administrative processes for project development, and sets timetables for individual projects. Taken together, these regulations define the formal institutions for the management and implementation of wind power projects at the provincial level. As a result, potential investors have relevant information about investment opportunities as well as advice and guidance about the practical steps needed to establish wind power projects in Inner Mongolia. The seven cities in Inner Mongolia that are expected to become the future base for the industry's provincial development have also issued their own policies for wind power development in recent years.

In stark contrast, however, the trajectory of renewable energy development differs vastly. Both Xinjiang and Inner Mongolia have large coal reserves and wind capacity. The two provinces were amongst the first adopters of renewable energy. However, the development of wind power in Xinjiang is somewhat of an outlier amongst first adopters of renewable energy. Xinjiang was the pioneer in wind power development and had the highest installed capacity until 2001 (Liu and Kekko, 2012). However, development since then has been stagnant, and the total installed capacity in 2008 only reached 20% of its potential (Zhang et al., 2016). While there were technological challenges, many studies cite the lack of province policy support as the primary cause of delayed renewable adoption. The resource-rich province's development only started in 2008, when Nur Bekri was appointed to Chairman of Xinjiang autonomous region, did energy development come a priority. He was subsequently promoted to the director of China's new National Energy Administration. According to one report, he was appointed because of his

tremendous experiences developing renewable energy in Xinjiang, which became of strategic importance to China's "one belt one road" initiative.

7. Conclusion

7.1. Discussions and Limitations

In focusing on the commitment aspect of policy, we inevitably make assumptions about the substantive aspect of these policies. Is a specific policy effective? For example, how meaningful is an additional 0.48 percent subsidy for solar generated electricity? Since incorporating all these factors will complicate the model unnecessarily, this paper proceeds from the general assumption that the presence of a province level policy commitment is positively correlated with increased installed capacity. This assumption is substantiated by the literature. Zhang et al. (2016) is the first to quantify province level policies and found that "a province with wind policies is more likely to have a strong and robust wind capacity and relatively stable growth trajectories over time." Specifically, the paper found that the installed wind capacity in a given province increases by 48.5% on average with the adoption of a [province] general energy plan (Zhang et al., 2016). their study found positive effect of proactive province engagement and green industry development (Yi and Liu, 2014). To enhance this research, we can run the Index against installed renewable capacity to check for validity.

7.1.1. Missing data & access

A major limitation of this research paper is the incomplete databases, which inevitably will affect the results and analysis of the information. This is a common problem with sub-national analysis,

as data is not often collected periodically and standardized. In China's case, it is well-known that the province level emissions data does not add up to the numbers provided by the National Statistics Bureau. We thus need to account for it when running our analysis.

Furthermore, the information problem is particularly acute with policy analysis. Many indicators of "Likelihood of Implementation" rests on the amount of details given within the policy and there is sufficient anecdotal evidence for that. From the author's own experience interning at a province level bureaucracy, committed provinces will produce several type of appendixes and supplementary province level policies to impress central government. However, many of these appendixes are not made public. Thus, in scoring commitment, we may miss details that were confidential.

Furthermore, each province differs in what constitutes as renewable energy. This is a particular problem for standardizing the percentage of renewable energy as total energy production and consumption. Inner Mongolia includes nuclear power in their calculation of renewable while Shanxi does not. However, this paper chooses to use the data as is and excludes nuclear power policies in the Index. This is because nuclear power still makes up an exceedingly small percentage of China's energy production and consumption. As of December 2010, there are only 13 operating nuclear reactors that contributed to 1.8% of China's total electricity generation (Ramana and Saikawa, 2011). As such, it is possible that those provinces that did not include nuclear power in their province statistical databases simply do not have nuclear plants. By tracking the location of the 13 nuclear plants indicated in Ramana and Saikawa (2011).

7.2. Conclusion

Overall, this paper shows that when central government provides support, the variation in province policy adoption is dependent on the governor's career incentives, the province's state capacity, and the vested interested present. My analysis shows that province governors are very responsive to the political and economic incentives provided by the central government. As such, in line with prominent climate policy scholars (Ye, 2014), I would recommend that the central government reevaluate its cadre assessment system to include more direct low-carbon energy targets. The revision to the "Work Regulations for the Promotion and Appointment of Leading and Party Government Cadres" in 2014 was a step in the right direction – changing the structure of cadre evaluation to include indicators connected to employment, environmental preservation, and social harmony.

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