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Policy learning and central–local relations: A case study of the pricing policies for wind energy in China (from 1994 to 2009)

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A Case Study of the Pricing Policies for Wind Energy in China
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Abstract

This paper brings together the key concepts of policy learning and central-local relations to examine how the efficacy of sustainability policies can be improved, with a particular reference to pricing policies for wind energy in China. Based on our comparative case-studies of three provinces, Guangdong, Shanghai and Xinjiang, we critically examine how central-local relations may facilitate or impede policy learning. Our analysis focuses on the policy changes *at the national level*, including the move away from the tendering policy to a fixed-price policy in 2009, and the *diversity of local policy responses* that include a local fixed-price policy in Guangdong, a two-tiered model in Shanghai and a *de facto* fixed-price policy in Xinjiang. We have three major key findings. Firstly, we found that technical and conceptual forms of policy learning have taken place in China, but the progression towards the highest form of policy learning, social learning, is limited. Secondly, we found that the established fabric of central-local relations has created facilitating conditions for as well as limitations to the advancements towards social learning. A national policy framework, a multi-level governance system, institutional arrangements for knowledge creation and learning, and a more participatory form of governance for civil society are some of the facilitating conditions. However, over-centralisation, the inertia against institutional changes and the failure to recognize the need for a more deliberative decision-making process are identified as the key barriers.

INTRODUCTION

Wind energy and other renewable sources have an important role to play in enhancing energy security and mitigating climate change impacts (IEA, 2008). According to the recent report published by the Intergovernmental Panel on Climate Change (IPCC) in 2011, as much as 80 percent of the world's energy supply could be met by renewables by 2050 (IPCC, 2011). However, the actual development of renewable energy has remained limited. According to the IPCC report, wind energy, for example, can provide more than 20 percent of worldwide electricity demand by 2050, but this renewable source contributed to only approximately 1.8 percent of the global electricity demand by the end of 2009 (Wiser *et al.*, 2011).

The physical availability of renewable resources appears not to be the major limiting factor on renewable energy deployment. The scale of the development often depends on the effectiveness of policies to overcome the economic, social and institutional barriers (Szarka, 2006; IPCC, 2011; IEA, 2008). However, policymaking for renewable energy often is a complex process. Renewable energy has developed in various ways across countries, often underpinned by different policy frameworks (Lipp, 2007). Countries often differ in their policy choices which range from quantity-based market instruments (such as a quota obligation) to price-based market instruments (such as renewable feed-in tariffs, REFIT) and to fiscal incentives (such as tax exemptions or reductions) (IEA, 2008). For instance, Germany has adopted the feed-in tariff policies which set the market price for wind energy since 1990s whilst the UK has adopted a renewable obligation system that requires electricity suppliers to source a certain proportion of their electricity from renewable since early 2000s (Harborne and Hendry, 2009; Lipp, 2007).

Renewable energy policies also vary in their effectiveness across countries. Whilst the REFIT policy in Germany, for example, has been commonly regarded as an effective policy for accelerating the deployment of wind energy during the 1990s, the policy discontinuity of the Production Tax Credit in the US has been criticized for causing a boom-bust cycle of development in the wind industry (Agnolucci, 2008). A good understanding of how and why those policies work, or fail to work, is therefore of academic and policy significance.

It is in this context that China has become part of the global trend of developing wind energy. Benefiting from the enactment of the Renewable Energy Law in 2005 and the associated supportive policies that cover pricing, R&D, grid access and other policy domains, wind energy has experienced substantial growth with its installed capacity doubling annually since 2005 in China (Fang *et al.*, 2012b; Liao *et al.*, 2010). China surpassed the US and Germany and now ranks first with a total wind installation capacity of 42.3 GW by end 2010 (GWEC, 2012). However, although promising, wind is still a fringe energy source contributing only 1.2 percent of the country's total electricity output with a total generation capacity of about 49 TWh in 2010 (ERI and IEA, 2011).

Pricing policies have been one of the most important policies for supporting wind energy in China. Following China's introduction of its first pricing policy for wind energy in 1994, this country has experienced drastic and interesting changes in its pricing policies at both national and local levels. At the national level, there was a prolonged debate between the choice of two policy options, the tendering policy (特许权) (a policy of price liberalisation) and the fixed-price policy (固定电价) (a policy of price regulation) throughout the 2000s. The tendering policy is a pricing approach that uses competitive bidding to introduce market competition. In contrast, the fixed-price policy is distinguished by the state control over price. The debate was ended only in July 2009 when the central government decided to replace the tendering policy with a nation-wide fixed-price policy. At the local levels, an interesting development is the variation of local pricing policies for wind energy in the 2000s. Guangdong, for example, pioneered local fixed-price policies while Shanghai used a two-tiered pricing policy. Xinjiang, in contrast, introduced a *de facto* fixed-price policy.

In the light of these policy developments in the wind energy sector globally as well as in China, it is important to understand how to improve the efficacy of sustainability policies, with a particular reference to pricing policies for wind energy in China. A growing body of literature has emerged to provide a better understanding of the development of wind energy in China. Work by Fang *et al.* (2012b); Han *et al.* (2009);

Hong and Möller (2012) studied technology options of wind power that include onshore, offshore and decentralised wind farms. Some studies examined major policy developments and challenges (Liao *et al.*, 2010; Liu and Kokko, 2010) whilst some evaluated policy effectiveness (Wang, 2010). Some assessed the economic aspects of wind development such as financing mechanisms (Cherni and Kentish, 2007; Yang *et al.*, 2010) whilst some (see for example Lema and Ruby, 2007; Liu *et al.*, 2002) studied non-economic factors such as institutional ones. The literature has however two major gaps. First, studies that explore the mechanisms of policymaking process that can explain policy success and failures are relatively limited. Second, whilst some case studies of individual Chinese provinces have been conducted (see for example Li 1999; Zhao *et al.*, 2009), comparative case studies that could enhance the generalisability of findings are limited in this area, with the exception of the work by for example Lewis (2007) and Mah and Hills (2012).

To partially fill these knowledge gaps, this paper aims to explore the theoretical linkages between the concepts of policy learning and central-local relations. We then apply the theoretical perspectives to examine and explain the evolution of the pricing policies for wind energy in China. Specifically, we address these questions:

▪ To what extent did policy learning take place and affect the evolution of the pricing policies for wind energy in China?
▪ How did the central-local relations in China create opportunities for and barriers to policy learning?

This paper is structured in the following way. First, we will discuss the theoretical perspectives of policy learning and central-local relations. We then explain the methodology of this study. This is followed by a detailed account of the evolution of the pricing policies for wind energy in China. We will examine how policy changes took place in three distinct phases at the national level whilst experiencing substantial local variations in Guangdong, Shanghai and Xinjiang. This is then followed by a discussion on how the established central-local relations created opportunities for, and constraints to, policy learning.

THEORETICAL PERSPECTIVES: POLICY LEARNING AND CENTRAL-LOCAL RELATIONS

Policy Learning

A scanning of the literature suggests that the concepts of policy learning and central-local relations may provide complementary insights to the policymaking process for wind energy in China.

Originating from studies of organisational learning (Busenberg, 2001), policy learning as a concept has come into focus in environmental studies as a mechanism to facilitate governance for sustainable development (Hills, 2006). Policy learning is a policymaking process in which policy makers and policy stakeholders deliberately adjust the goals, rules and techniques of a given policy in response to experiences and new information (Hall, 1993).

Policy learning as a concept is distinguished from other related terms such as policy innovation in some subtle ways. Whilst policy innovation generally refers to the development of new policies which reflect significant departures from previous responses to public problems (Deyle, 1994), policy learning emphasises trial-and-error and experimental approaches to policymaking. Learning from the past, increased knowledge of the problems (including the problem attributes and the factors affecting them), adjustments, feedback loops are the key elements of policy learning (Sabatier, 1988).

Central to the concept of policy learning is the differentiation of three types of learning: technical, conceptual and social learning. They evolve progressively from one another and each of them can be characterised by the indicators listed in *Table 1*. Technical learning is a weak form of policy learning. It consists of a search for new policy instruments (Gouldson *et al.*, 2008). Technical learning however is generally technocratic. It occurs without fundamental discussion or adjustment of policy objectives and basic strategies (Bennett and Howlett, 1992; Fiorino, 2001; Gouldson *et al.*, 2008; Hall, 1993).

Conceptual learning is an intermediate form of policy learning. It is a process in which policy goals are redefined, problem definitions are debated, and problem-solving strategies are adjusted. Conceptual learning is therefore "more radical and far-reaching" than technical learning (Glasbergen, 1996: 182).

Social learning, as the most advanced or strongest form of policy learning, is the mode of policy learning that has increasingly come into scholarly focus (Glasbergen, 1996). In contrast to technical and conceptual learning, social learning emphasises the interplay between societal actors that improve policies (Glasbergen, 1996). It also emphasises cooperative relations among policy stakeholders and the collective responsibility for policy implementation (Fiorino, 2001; Glasbergen, 1996). Social learning therefore requires more open and responsive communication.

Table 1: The progression of the three forms of policy learning

Forms	Technical Learning	Conceptual Learning	Social Learning
Indicators	▪ Search for new policy instruments, but with no adjustment of problem definition or policy objectives ▪ Favour incremental changes – e.g. more harmonised regulation, more supplementary rules	▪ Problem definitions are debated, policy objectives are redefined; and strategies are adjusted ▪ More radical and far-reaching	▪ Policymaking is based on interaction and communication, and emphasises the social context and social forces in shaping the policy process ▪ Collective responsibility for policy implementation

(Adapted from Fiorino, 2001; Glasbergen, 1996)

The progression from technical learning to social learning is of significance to policymaking because it may improve policy efficacy and legitimacy (Glasbergen, 1996; Gouldson *et al.,* 2008). What, then, are the favourable conditions that facilitate the progression? The literature suggests that reflexivity, participation, dialogue and adaptivity are the major enablers (Gouldson *et al.,* 2008; Voß and Kemp, 2006). Policy learning therefore requires the move away from a top-down policymaking approach to one that promotes feedback, experimentation, diversity, an awareness of

unintended policy outcomes, and a willingness and ability to adjust policy (Argyris, 1994; Hall, 1993).

Policy learning is a concept that is highly relevant for understanding the evolution of wind energy policies. The substantial differences across countries in terms of their policy choices with varied outcomes suggest that policymaking for wind energy is a "searching" process in which learning from (others') experiences is a key element of wind energy policies (IEA, 2008). In addition, western experience suggests that wind energy policies often require experimentation and frequent adjustments. In Germany, for example, the degression of feed-in tariff rates which adjusts the premiums for renewable electricity over time is to encourage greater competitiveness between wind energy and other renewable energy sources (Mabee *et al.*, 2012).

In the context of China, policy learning is a particularly relevant concept because of the reliance on the "groping for stone to cross the river (摸着石头过河)" approach in this country (Naughton, 1995). This Chinese approach emphasises an experimental and trial and error learning approach – for its economic reforms and reforms in other major public policy areas. Furthermore, the relatively intensive policy changes for wind energy in China in recent decades suggest that policy adjustment, learning-by-doing and other key theoretical insights of policy learning are highly relevant to our analysis.

Central-local Relations

The literature on central-local relations is another body of work that can offer complementary insights to policy learning. In the field of sustainability studies, the emerging role of local governments has increasingly attracted scholarly interest (see for example Bell and Gray, 2010; Couch and Dennemann, 2000; Dodman, 2009; Freeman *et al.,* 1996; Roseland, 1997; Satterthwaite, 2010; Schmidt Dubeux and La Rovere, 2007). The literature is instructive in explaining that because of their strengths of proximity, local knowledge, trust and institutional flexibility, local governments can play a major role in promoting effectiveness in sustainability policies (Schienstock, 2005).

Another theme of the central-local relations literature sheds light on the pivotal, and new, roles of national governments in the increasingly complex governance context. The literature highlights that national governments need to formulate policy frameworks to enhance policy consistency at sub-national levels on the one hand, and to promote local policy capacity through decentralisation on the other hand (Assetto *et al.*, 2003; Rondinelli *et al.*, 1989).

Central-local relations have been a recurring theme in Chinese studies and in wind energy studies. Work by for example Guo (2001), Oi (1995) and O'Brien and Li (2004) has studied the role of central-local relations in economic reforms, housing, environmental and other major policy areas in the Chinese context. On the other hand, beyond China, the impacts of central-local dynamics on the development of wind energy have also attracted growing scholarly attention. But those studies are mostly in the context of federal political systems such as in the U.S. and Spain (Lewis, 2007; Wilson and Stephens, 2009). Work in the specific context of unitary states such as China is however relatively limited, with the exception of the work by for example Mah and Hills (2008, 2010).

Although the theoretical insights of policy learning and central-local relations are likely to be useful in guiding our analysis, the literature is limited in relation to renewable energy policies and in emerging countries such as China. Work by for example Bennett *et al.* (2001), Buckley *et al*. (2004) and Hu *et al*. (2005) examines policy learning in China but has a rather narrow focus on knowledge and technology transfer. More robust studies that integrate the theoretical perspectives of policy learning and empirical analysis in the context of China has been scant, with a few exceptions such as the work by Gouldson *et al.* (2008).

This paper brings together the key concepts of policy learning and central-local relations for guiding our analysis. We will adopt the typologies of policy learning and associated indicators (*Table 1*) to assess to what extent policy learning has occurred in China. We will then examine how the central-local relations have facilitated or constrained policy learning in China.

This paper adopts a comparative case-study approach which is well suited to provide answers to "how" and "why" questions (Yin, 2003). China has a vast country with great diversity across its provinces. Guangdong in the southeast coast, Shanghai in the east coast and Xinjiang in the northwest interior are selected for their contrasting geographical, political, socio-economic features as well as energy profile (*Tables 2 and 3*). These three provinces are selected also to represent different local models of pricing policies. Guangdong pioneered China's first fixed-price policy while Shanghai adopted its own two-tiered pricing policy for wind. Xinjiang used a de facto fixed-price policy. By comparing and contrasting similar and different patterns across the cases, this study will identify the key mechanisms through which central-local relations in China facilitate or constrain policy learning.

Table 2: The basic characteristics of Guangdong, Shanghai and Xinjiang (2010)

	Guangdong	*Shanghai*	*Xinjiang*
Location	Southeast; coastal	Central; coastal	Northwest; inland
Capital	Guangzhou	N.A.	Urumqi
Provincial status	Province	Municipality	Autonomous region
GDP (billion yuan)	4,601	1,717	543.7
Population (million)	104.3	23	21.8
Area (km²)	179,757	6,341	1,664,900

(Sources: HKTDC, 2011a, 2011b, 2011c; National Bureau of Statistics of China, 2010)

Table 3: Energy profile of Guangdong, Shanghai and Xinjiang (2009)

	Guangdong	*Shanghai*	*Xinjiang*
Total energy consumption (10,000 tons of standard coal equivalent)	24,654	9,952	7,526
Coal consumption (10,000 tons)	12,509	5,844 [#]	7,418
Electricity consumption (100 million kWh)	3,609.64	1,153.38	547.88
Electricity price (yuan/kWh)	0.6066 [a]	0.617 [b]	0.479 [c] [*]

#: Data for Year 2010
*: Data for Year 2008
a- For domestic tariff lower than 1000 kWh
b- For domestic tariff for Guangdong
c- For domestic tariff lower than 1000 kWh in Urumqi

(Sources: National Bureau of Statistics of China, 2010; Shanghai Statistics Bureau, 2011; Statistics Bureau of Xinjiang Uygur Autonomous Region, 2011; NDRC 2009a; NDRC 2009b; XJDRC, 2008)

The analysis presented here draws on data and information derived from desktop research and twelve semi-structured interviews with key stakeholders. The interviews took place in Beijing, Guangdong, Shanghai and Xinjiang between 2006 and 2009, and were conducted with government officials, wind farm developers, wind turbine manufacturers, academics, NGOs and industrial associations. The interviewees were carefully selected informants who were knowledgeable about the issues studied. The list of interviews is provided in appendix.

PRICING POLICIES FOR WIND ENERGY IN CHINA: THE THREE DISTINCT PHASES AND THE LOCAL VARIATIONS

China built its first wind farm in Shandong in 1986 (Zhang, 2010). However, it was only in 1994 that this country introduced its first pricing policy for wind energy. Since then, three distinctive phases of the pricing policies can be identified at the national level. In the corresponding time period, a diversity of the local responses emerged in the three selected provinces, Guangdong, Shanghai and Xinjiang. The three phases and local variation of the pricing policy are illustrated in *Figure 1* and are discussed as follows.

[Insert Figure 1 about here]

The three distinct phases at the national level

Phase 1 (from 1994 to 2003) started when China introduced its first pricing policy for wind energy, the "repay plus profit" pricing formula in 1994. This first pricing policy was implemented only almost ten years after the country built its first wind farm in 1986 (Greenpeace, 2005). This pricing policy set an on-grid price for wind energy that would repay capital costs with interest plus a reasonable profit (Lema and Ruby, 2007; Mah and Hills, 2008). This policy was introduced at a time when wind energy was small in scale in China with a total installed capacity less than 15 MW (Lema and Ruby, 2007)). This repay plus profit pricing policy was able to create some incentives for a slow, but steady, growth in new wind installations (Mah and Hills, 2008; Fang *et al.*, 2012a).

Phase 2, from 2003 to July 2009, was a period of policy divergence in which the central government shifted over its choices over the two competing pricing options: the tendering and fixed-price policies. This phase also showed a difference between the central government's choice and local preferences in the pricing options.

The most important development in Phase 2 was the introduction of the tendering policy for wind energy, first as pilots in 2003, and later as a nation-wide policy in 2006. Phase 2 experienced a rapid increase in wind power installed capacity, with installed capacity doubling annually since 2005 and reaching 25.8 GW in 2009 (Fang *et al*., 2012a; Zhang, 2010).

A distinctive development in this phase is the emergence of a spate of "pseudo-tendered" wind projects (「假招標」) which were approved by provincial governments. Those projects concentrated in a number of provinces including Inner Mongolia, Heilongjiang, Jilin and Hebei (Interviews BJ/01/2009; BJ/02/2009). Those "provincial" tendered projects differ from those tendering projects introduced by the central government in two ways. First, those projects are small in scale – most of them were at a scale just below 50 MW (mostly between 45 and 49.5 MW) in order to stay within the provincial project approval authority of provinces and to bypass the red-tape of the central government. Second, their on-grid prices are "pseudo" in a sense that the tendered prices are allegedly set through under-the-table negotiation among local governments and developers (Interview BJ/01/2009).

Those alleged pseudo-tendered projects are an unintended outcome of the 2006 tendering policy, causing negative impacts to the development of wind energy. Higher tendered price drove up wind prices. In Hebei, for example, the local tendered price was 0.61 yuan/ kWh, but the tendered price of a national tendered project which locates also in Hebei was only 0.54 yuan/ kWh (Interview BJ/03/2009). Another negative impact caused by those pseudo-tendered projects is that they tend to under-utilise prime wind sites. In order to bypass the red-tape of the central government, those local tendered projects tend to fragment a prime wind site into a number of small wind farms in order not to exceed the 50 MW-provincial approval authority. The fragmentation of prime wind sites has undermined the opportunities to optimise electricity output through better turbine siting and project coordination (Interview

BJ/02/2009). To a large extent because of the undesirable outcomes of the "pseudo-tendered" projects, the central government ended the tendering policy in July 2009 and replaced it with a fixed-price policy.

Another feature of Phase 2 is that while the central government has shifted over its choice over the two competing pricing options, some provinces such as Guangdong, Shanghai and Xinjiang have shown their own preferences on pricing options. A detailed account of those local variations is provided in the next section.

Phase 3, starting from July 2009 onwards, is a phase of policy convergence between national and local policies. A nation-wide fixed-price policy, which was introduced in July 2009, replaced the tendering policy and ended the debate over the choice between the tendering and fixed-price policies. All Chinese provinces are categorised into four regions mainly according to their differences in wind resources. The four categories of provinces are assigned with different fixed benchmark prices which range from 0.51 to 0.61 yuan/ kWh. Our interviews with some industrial experts, key government officials and a number of other key stakeholders suggest that this policy generally is an effective policy to enhance economic viability of wind projects (Interviews BJ/01/2009; BJ/02/2009; BJ/03/2009).

In the light of these major policy developments in the three phases, it is interesting to examine to what extent policy learning has occurred in China. Based on the distinction between technical, conceptual and social forms of learning stated in *Table 1*, we found that technical and conceptual forms of policy learning have taken place in these three phases. However, the progression towards social learning was very limited. There were only some early signs of social learning in Phase 3 (*Table 4*).

In Phase 1, the "repay plus profit" pricing policy is a good example of *technical* learning. This policy introduced incremental policy changes – by explicitly applying an existing pricing policy for general power generation projects to wind energy. This policy however did not show evidence on conceptual or social learning. There was no serious reflection on problem definitions or policy objectives – which could have been a key indicator of the higher forms of policy learning.

In Phase 2, the policy changes provided some evidences of conceptual learning. The worsening environmental conditions in China coupled with China's 'fourth generation' leadership headed by President Hu Jintao has created a new policy window to reflect about the need for more radical policy options to support wind energy and other renewable energy sources. The policy options in Phase 2 were widened. The pricing policies for wind energy, including tendering and fixed-price policies, were put on the policy agenda.

In addition, there were some early signs of social learning in Phase 2. An issue network comprised Greenpeace, a reformist government official (who was Li Junfeng, the Deputy Director-general of the Energy Research Institute of National Development and Reform Commission, NDRC) and wind experts such as Shi Pengfei was present to advocate for fixed-price policies (Mah and Hills, 2008). The social forces created by that issue network existed and were there to shape the policy process. However, the signs of social learning were weak. The issue network played consultative and advisory roles, but it shared no power with the NDRC who made the ultimate decisions on policy choices.

In Phase 3, the abandonment of the tendering policy and the adoption of the fixed-price policy have shown more active, although still limited, activities of social learning. The central government decided to abandon the tendering policy in July 2009 in part because it lacked effective measures to eradicate those pseudo-tendered projects in provinces (Interview BJ/03/2009). It is evident that learning from the unintended policy outcomes, and more importantly, the underlying incentive structures of the policy stakeholders was a key part of the policy learning process. As a senior government official from the NDRC noted, "we cannot change people's behaviour directly, but we can provide new incentives to encourage behavioural change" (Interview BJ/03/2009).

It is also noteworthy another characteristic of Phase 3 is the presence of social forces in the policy-making process. It was the forces for change created from wind farm developers and local governments that forced the central government to learn from the unintended policy outcomes, adjust its policy strategies and abandoned the controversial tendering policy (Interviews BJ/01/2009; BJ/02, 2009). This interaction

between the central government and social forces in policymaking is a distinguished feature of an early sign of social learning.

Local responses in Guangdong, Shanghai and Xinjiang

In the sections that follow, we will provide an overview of the diversity of the local pricing policies for wind energy in Guangdong, Shanghai, and Xinjiang in Phase 2 (from 2003 to July 2009).

(a) Guangdong: a pioneer of the fixed-price policy

Whilst the central government introduced a fixed price policy only in 2009, Guangdong pioneered a fixed-price policy years ahead of the central government's action. Since 2001, Guangdong has introduced three variants of fixed price policy. In 2001 Guangdong introduced its fixed-price policy, which was also the first of its kind in the country, by pegging the on-grid price of wind energy to the average electricity selling price of the grid company (Guangdong DPC *et al.*, 2001). This was then replaced by its second fixed price policy introduced in 2004 which fixed the on-grid price at 0.528 yuan/ kWh (Garrah Hassan, 2005). Guangdong introduced its third fixed price policy for wind energy three years later in December 2007 by revising the fixed price further upward to 0.689 yuan/ kWh (GD PCA, 2007).

Guangdong's pricing policy has been characterised by its ability to insist on its own local policies, even at the risk of confronting central policies. Guangdong's second fixed-price policy in 2004 was widely perceived among Chinese wind energy experts as a radical policy because the central government had already indicated its interest in the tendering policy in 2003 through introducing the tendering pilots. More attention was drawn on to Guangdong in 2007 when the province introduced its third fixed-price policy - even though the central government had introduced a nation-wide tendering policy one year ahead in 2006.

Why, then, was Guangdong able to pioneer radical policies and insist on its own approach? A major factor is the presence of a policymaking process which was

relatively permeable to non-state actors particularly local wind energy experts and an issue network.

A local wind expert, Yu Hongying, the then chief engineer of Guangdong Ji Hua Wind Energy Company (广东集华风能有限公司 *Guangdong Jihua Fengneng Youxian Gongsi; hereafter referred to as Ji Hua*) and a committee member of the China Wind Energy Association, was a catalyst for the first fixed-price policy in Guangdong. In 2001, Yu was commissioned by the Guangdong government to provide an assessment report of the prospects for the development of wind energy in Guangdong. Following the completion of the assessment report, also in 2001, upon the request of the government, Yu submitted a draft of an administrative circular in which a fixed-price policy was first proposed (Interview GD/01/2008).

On the other hand, the issue network, which was discussed in earlier sections, played an important role in sustaining the option of a fixed-price policy in the policy agenda in Guangdong over the years. Greenpeace, which led the issue network, coauthored with wind energy experts and some reformist officials in the central government a number of studies in Beijing and Guangdong. Those studies contributed to a more fact-based debate on the comparative advantages of different pricing options (Greenpeace, 2005; Li *et al.*, 2007). Through its offices in Beijing and Guangdong, Greenpeace was particularly instrumental to the functioning of this issue network that was able to span the national and provincial divide.

Based on the indicators shown in *Table 1*, it is evident that Guangdong was able to advance from conceptual to social learning. The presence of an issue network and other social interactions in the policymaking process is a defining feature of social learning in Guangdong. Furthermore, Guangdong's persistence on it own local fixed-price policy showed the province's ability to formulate and implement more radical policy strategies in regardless of the policy preferences of the central government.

(b) Shanghai: a national policy followed; locally-grown two-tiered policy abandoned

While Guangdong pioneered the fixed-price policies, Shanghai introduced a "two-tiered" pricing policy for wind energy in 2003 when it built its first wind farm in Fengxian (奉贤). This two-tiered pricing policy was a locally grown policy which originated in 1990s when Shanghai used this policy initially to provide economic incentives for investment in an oil-fired power plant (Interview SH/1/2008).

The locally grown two-tiered pricing policy for wind energy guaranteed the wind farms a basic grid price (which is linked with the installed capacity) plus an "adjustable" price that varies with the actual electricity output (Interviews SH/1/2008; SH/2/2008). The two-tiered policy was widely perceived among local wind farm developers as a more preferred option to the tendering policy as this policy tend to guarantee at least some profit incentives for wind farms (Interviews SH/1/2008; SH/2/2008). Shanghai however abandoned this "two-tiered" policy in 2006 to follow the central policy of tendering. Shanghai issued a local regulation in 2006 which states that all local wind farms have to be tendered (Shanghai DRC, 2006).

Based on the indicators shown in *Table 1*, it is evident that Shanghai has advanced to conceptual learning but not yet to social learning. The introduction of its locally grown two-tiered pricing policy has shown the city's capability in developing innovative policy strategies. However, Shanghai's capability in formulating innovative policies was not institutionalised and was rather ad hoc in nature. Its abandonment of its locally-grown two-tiered pricing policy in 2006 revealed the limitations of Shanghai's policy learning process. When its local policy was in conflict with a national policy, there was no evidence suggesting that Shanghai went through a serious weighing process between the two competing pricing policy options before it abandoned its local policy.

 (c) Xinjiang: a *de facto* fixed-price policy

Like Guangdong, Xinjiang was not interested in the tendering policy. But unlike Guangdong and Shanghai, Xinjiang did not demonstrate its capacity in policy innovation. Xinjiang also did not explicitly confront the central policy as Guangdong did. Rather, Xinjiang used the conventional "project-approval" path - several of its

new farm proposals were submitted to the Department of Price of the NDRC for on-grid price approval. In 2007, four wind projects in Xinjiang were granted the same price, at 0.51 yuan/ kWh, by the Department of Price. It is evident that this is a *de facto* fixed-price policy because the four wind farms in Xinjiang, although located in two different wind districts which differ in the wind resources and ownership and therefore would indicating cost differences, were granted a flat price (NDRC, 2007; Interview XJ/01/2008).

Based on the indicators shown in *Table 1*, Xinjiang has shown evidence of technical learning while conceptual or social learning has been minimal, if there was any. Xinjiang appeared to be a follower of the central policy and showed limited capacity to explore alternative policy options. The *de facto* fixed-price policy can be regarded as a harmonized policy that is in line with the national policies rather than an innovative strategy.

To sum up, our findings suggest that the progression from technical to conceptual learning has taken place at both the national and provincial level. However, although there were some emerging signs of social learning in phases 2 and 3 and in Guangdong, those signs were weak (*Table 4*).

Table 4: The pricing policy for wind energy in China:

The progression from technical to social learning

		Technical → Learning	Conceptual → Learning	Social Learning
National Level	Phase 1	●	○	○
	Phase 2	●	●	◐
	Phase 3	●	●	◐
Provincial Level	Guangdong	●	●	◐
	Shanghai	●	●	○
	Xinjiang	●	○	○

●: Strong evidence

◐: Weak evidence

○: Indiscernible evidence

UNDERSTANDING THE MECHANISMS OF POLICY LEARNING: CENTRAL-LOCAL RELATIONS AS FACILITATIVE FACTORS AND AS BARRIERS

Our observations regarding the progression of policy learning in our cases raise two important questions: Did central-local relations matter to policy learning in China? If so, how did the established fabric of central-local relations create opportunities or barriers to policy learning?

Our empirical evidence suggests that the established fabric of central-local relations has created both facilitating conditions for and limitations to the advancements towards social learning. A national policy framework as local drivers for policy learning, a multi-level governance system that promotes local experimentation, institutional arrangements for knowledge creation and learning, and a more

participatory form of governance for civil society to play a more important role are the four facilitating conditions. However, over-centralisation, the inertia against institutional changes and the failure to recognise the need for a more deliberative decision-making process were found to be the key barriers. *Figure 1* shows the effect of the central-local relations on policy learning processes. We will now discuss our observations in relation to these issues.

[Insert Figure 2 about here]

(1) Central-local relations as *favourable conditions*

A national policy framework as local drivers for policy learning

Since the enactment of the renewable energy law in 2005, the central government has gradually strengthened its policy framework through setting renewable targets as well as introducing a growing number of policies for wind energy in the areas of pricing, R&D, landuse as well as grid access. In China's unitary political system, local governments are a key player for the local implementation of national policies which are formulated by the centralised government (Fang *et al.*, 2012b; OECD, 2005). The national policy framework has therefore created a uniform policy setting that drove provinces to become much more active in formulating, developing and adjusting local policies for supporting wind energy. Guangdong, Shanghai and Xinjiang and many other Chinese provinces have set up wind energy targets, formulated major policies for supporting this energy source.

A multi-level governance system that promotes local experimentation

Policy experimentation and diversity are important for policy learning (see for example Argyris, 1994; Hall, 1993; Lafferty and Knudsen, 2007). In China, the economic reforms and decentralization processes over the past three decades have resulted in a more multi-level form of governance that allows provincial governments to act as the "policy laboratories" for the country, most notably in the areas of economic reforms (Nee and Mattews, 1996; Wright, 2000; Li, 2002). In relation to wind energy policies, provinces have also served as the "policy laboratories". Guangdong, for example, pioneered China's first fixed-price policy in 2001 while

Shanghai pioneered China's first green electricity market in 2005 (SH ECSC, 2009; Mah and Hills, 2008).

Provinces particularly have an important role to play in policy experimentation because they, as the highest-level of local states, are the only sub-national states which have power to make legislation and therefore have an important role to play in implementing central legislation and policies at the local levels (Qi *et al.,* 2008). Furthermore, it is noteworthy that the central government has delegated power to provinces to approve small projects – those with an installed capacity below 50 MW. The aggregate size of these small projects has been substantial, contributing approximately 50 percent of the new wind installations in 2007, and 60 percent in 2008 (Interview BJ/03/2009). It was through this delegation of project-approval authority that provinces became influential players in the development of wind energy.

Institutional arrangements for knowledge creation and learning

Information and knowledge are critical to policy learning (Glasbergen, 1996). Our analysis suggests that a national renewable energy surcharge introduced in 2006 has become a critical new institutional arrangement that improved information and knowledge.

The prolonged debate between the two pricing options in China was to a large extent due to the lack of wind data. Back in 2003 when the central government chose to implement tendering pilot projects rather than fixed-price policies, wind data such as the actual installed capacity and wind electricity yield were vastly lacking. The lack of these basic wind data in effect ruled out the fixed-price policy option. It is because the government was not able to determine what level a price should be fixed at so that it could provide economic incentives on the one hand and avoid windfall profits on the other hand.

This political preference started to shift and favoured a fixed-price policy only in recent years when the central government introduced a national renewable energy surcharge in 2006. How, then, did the surcharge system enable the central government to adjust its policy choices?

This surcharge system originally is designed as a national cost-sharing system for wind energy. The renewable energy surcharge, imposed on all electricity consumers, was first set at 0.001 yuan/ kWh in 2006, and revised to 0.004 yuan/ kWh in November 2009. Provinces rich in wind energy such as Xinjiang can collect money by selling wind energy to wind-impoverished provinces. Some provinces, in particular those with the potential to earn money by selling wind energy, are therefore given a strong economic incentive to increase local new wind installations. Xinjiang, for example, received 43 million yuan subsides from other provinces under this cost-sharing system between January and September in 2007 (NDRC, 2008).

The functions of this surcharge system have extended beyond cost-sharing. The system has also become a new institution that creates economic incentives for wind farm developers and grid companies to submit wind energy data. Crucial data for determining a reasonable fixed-price level for wind energy including the actual installed capacity and actual wind electricity output now can be collected by the NDRC. What more important is that the reliability of the data is also enhanced through cross-checking from two data sources, one from the wind farm operators and the other from the grid companies (Interview BJ/01/2009). This surcharge system was instrumental to policy learning because it has created a new institution that improved information and knowledge, with respect of both the availability and accuracy of wind data. This observation on institutional change suggests that new institutions for knowledge creation and accumulation and information disclosure are a key change that is required to break the inertia that obstructs policy learning. As Shi Pengfei, a wind energy expert in China, noted, the availability of a relatively comprehensive wind dataset has created "a prerequisite that allows the fixed-price policy to be introduced in China" (Interview BJ/01/2009).

A more participatory form of governance for civil society

Social learning, the most advanced form of policy learning, has an emphasis on the role of non-state actors such as civil society and the social interactions in policymaking (Glasbergen, 1996). Our observations relating to the presence of an issue network particularly highlight the distinctive form of civil society in the Chinese

context. In China, the decline of central planning since the economic reforms has been accompanied by an expanding civil society. Although it has been extensively documented that civil society in China has remained constrained in terms of scale, institutionalization and impacts (see for example Ho, 2001; Shi and Zhang, 2006), our empirical evidence suggests that societal actors such as NGOs and industrial associations appear to have some important roles to play in policy learning.

As our earlier sections have discussed, an issue network comprised of a middle-ranking reformist government official, Greenpeace China, Energy Foundation, Chinese Renewable Energy Industries Association and a number of renowned Chinese wind experts played important roles in the policy process for wind energy. The issue network led by Greenpeace was able to keep a fixed-price option alive in policy agenda over the years, even though after the central government had chosen the tendering policy.

It is also noteworthy that Greenpeace was able to gain credibility for a fixed-price policy through networking with mid-rank government officials in the NDRC, and the mainland and international experts on wind energy (Mah and Hills, 2008; Interviews BJ/02/2009; BJ/04/2009). The workings of this issue network appeared to highlight that the partnership between NGOs, mid-ranking reformist officials and experts may serve as an important, alternative pathway for civil society in the Chinese contexts.

(2) Central-local relations as *barriers*

Although this paper has shown that there is considerable potential for policy learning, we suggest that three types of tensions emerged in the established central-local relations appeared to constrain policy learning. The first type of tension is *the tensions between centralisation and decentralisation*. Our cases suggest that there was a strong tendency of centralisation, and in some cases over-centralisation, which tended to standardise provincial policies. The uniformity of local policies was counter-productive to a large extent. Good examples to illustrate this problem are the local initiatives of policy innovation in Shanghai and Guangdong. In both cases, it is evident that strong influence from the central government constrained policy innovation in localities. Shanghai abandoned its local two-tiered pricing policy.

Guangdong deliberately modulated the price level when it introduced its second fixed-price policy in order to avoid central intervention (Interviews GD/01/2008; GD/02/2008). It is of policy concern that local needs, local contexts and local opportunities were not seriously taken into account by the central government when they made the choices about the pricing policies for wind energy.

The second type of tension is the *tensions between the organisational traditions and the institutional changes required for policy learning*. The well documented sectoral fragmentation, or "tiao-tiao-kuai-kuai" problem of the Chinese government agencies (see for example Lema and Ruby, 2007; Wu and Wang, 2007), has obstructed policy learning for the wind energy policies. China's fragmented energy bureaucracy involves two key agencies at the central level, the NDRC and the State Electricity Regulatory Commission (SERC) (Mah and Hills, 2008). Under the NDRC, the newly-established National Energy Administration (NEA), and the Department of Price are resided with different responsibilities (*Figure 3*). The NEA, which replaced the NDRC's Energy Bureau, while still under the management of the NDRC, has been elevated to the status of a half-level ministry (副部級) and is responsible for the planning and policy formulation of renewable energy. But a major constraint on NEA's ability is that the price-setting power of energy, including wind energy, remains the purview of the Department of Price (Interview BJ/02/2009).

[Insert Figure 3 about here]

This fragmented energy bureaucracy has obstructed policy learning in a number of ways. In particular, the conflicting interests between the Department of Price and the NEA has resulted differences in policy preferences over the tendering and fixed-price policies. The Department of Price is responsible for approving price applications and therefore tends to favour a fixed-price policy as this is a Department of Price-led approach for approving wind projects. In contrast, the NEA is responsible for coordinating the tendering projects and therefore tends to favour tendering policies as tendering is an NEA-led approach (Interview BJ/02/2009). The problem of

departmental fragmentation has obstructed policy coherence and policy learning as the pricing policies evolved over the past years (Li *et al*., 2007).

The third type of tension is the *tensions between the Chinese policy style of groping for stones to cross the river" and the need for a deliberative decision-making system.* The central government's decision to choose the tendering policy in 2003 is another example of Chinese policy style of "groping for stone to cross the river" (Naughton, 1995). Central to this policy style is the learning-by-doing approach in circumstances of uncertainty. Wind energy data, which is essential for using the fixed-price policy was seriously lacking in China in 2003. The use of the tendering policy since 2003 in China may be regarded as a pragmatic approach. However, some Chinese industrial experts and wind farm developers have pointed out that this experimental approach was not without cost. A major negative impact resulted is that while learning was active in *ex post* phase of policymaking, not much learning was able to take place in the *ex ante* phases. As such, the *ex post* policy adjustment process in response to negative, unintended policy outcomes was politically sensitive, time-consuming and economically costly. The under-emphasis on deliberation in decision-making, and the over-reliance of the "groping along" approach should be of policy concern.

Furthermore, although the Chinese decision-making system in relation to wind energy was relatively open, it was open only during the early stages of the policy process. The system remained closed towards the final stages when the NDRC decided to choose the tendering policy for nation-wide implementation in 2006. Why the fixed-price model was not chosen despite general support from the Chinese wind experts and industries was not explained to the public or deliberated in an accountable manner (Mah and Hills, 2008).

(3) Explaining local variations

Our case studies have shown that there are local variations of wind energy policies in China. It has been quite extensively documented that policy learning is context-bound (Glabergen, 1996). Our findings have instructively contribute to a better understanding of the concept of policy learning by bringing in the sub-national

dimensions. Guangdong, Shanghai and Xinjiang differ in their local economic, social, political and energy characteristics (*Tables 2 and 3*). Whilst energy, socio-economic and political features can all be the contextual factors that could explain the local variations across our cases, this study has limited access to the information relating to the economic and energy characteristics of the provinces and is therefore not able to assess the impacts of local economic and energy factors on the policy learning process. Our empirical evidence however points to the importance of local political cultures as a factor contributing to the local variations.

In Guangdong, the long tradition of policy autonomy in Guangdong has created a stronger local leadership that is more willing to introduce policies that are perceived as more appropriate for local interests, even at the risk of confronting central policies (Cheung, 1998; Remick, 2003). Guangdong's fixed-price policies is a good example showing the province's persistence in formulating its local policies rather than following the central government's preference on the tendering policy. Economically, Guangdong's strong economy and the presence of a relatively high tariff level (IEA, 2007) are other contextual factors that allowed it to extend its policy choice to the fixed-price option which tends to impose financial burden and induce tariff increases.

These features of the policy learning process in Shanghai appear to be in line with some of its contextual characteristics. The prominent role of Shanghai in China has given a strong sense of responsibility to the Shanghai government to take the lead in institutional innovations (Interviews SH/03/2006; SH/04/2006). The two-tiered pricing policy for wind energy was one of the numerous examples of policy innovation in the area of environment. Other examples include the establishment of an "Investigation and Enforcement Team for Energy Efficiency" back in 1998. This investigation team, commonly called as the "Energy Efficiency Police", was the first of its kind in China (Shanghai Government, 2001; Interview SH/03/2006).

On the other hand, however, Shanghai's capability of policy learning appeared to be constrained by its close political linkages with the central government. Shanghai is one of the four municipalities which have been granted the administrative status of a province, and are directly subordinated to the central government (Tang *et al.*, 1997). The close links to Beijing may also constrain Shanghai's policy autonomy. It has been

noted that the Shanghai government tended to be more subject to the central influence in policymaking than leaders of other provinces were (Li, 1998). The abandonment of the two-tiered pricing policy is another example of Shanghai's being the follower of national policies.

Xinjiang's follower role appeared to have their root in the political context. The constant threat of separatism, its geographical remoteness from Beijing in combination with its heavy reliance on the central budget has led the central government to exercise strong influence in this province in all political fronts including the energy policies (Research Group, 2008; State Council, 2003; Interview XJ/03/2008), giving this province limited flexibility in policy innovation.

CONCLUSIONS

This paper examined the evolution of the pricing policies for wind energy at the national level and in the three Chinese provinces. By assessing to what extent and how policy learning worked in the Chinese context, we have three major findings. Firstly, our analysis suggests that policy learning took place largely in the forms of technical and conceptual learning at both national and provincial levels. The emergence of social learning was evident but was limited. Some early signs of social learning were found in the second and third phases at the national level and in Guangdong but not in Shanghai nor Xinjiang. It is evident that despite a progression from technical to conceptual learning was evident, further advancement to social learning – the highest-order of learning - was constrained.

Secondly, our analysis has made theoretical contribution to the perspective of policy learning by bringing in the central-local dimensions. We have illustrated how the central-local relations were a critical factor that influenced policy learning processes in China. The central-local relations on the one hand facilitated policy learning but on the other hand constrained it. We have identified that a national policy framework as local drivers for policy learning, a multi-level governance system that promotes local experimentation, institutional arrangements for knowledge creation and learning, and a more participatory form of governance for civil society to play a more important role are the four facilitating conditions that are embedded in the existing central-local

relations. However, three types of tensions – the tensions between centralisation and decentralisation, the tensions between the organisational traditions and the institutional changes need for policy learning, and the tensions between the Chinese policy style of "groping for stone to cross the river and the need for a deliberative decision-making system – existed and constrained policy learning.

Thirdly, we found that political culture in the provinces was a key factor explaining local variations in the policy learning process. Whilst it has been quite extensively discussed that policy learning is a process that is context-bound (Glabergen, 1996), our findings contribute to the literature by bringing in the sub-national dimensions.

Our findings have important policy implications. China may have to examine its central-local relations in order to facilitate policy learning. It appears that policy learning requires both policy convergence favoured by central monitoring and adaptability provided by local experimentation. The central-local relations may need to be reshaped so that China's environmental governance system can better incorporate the emerging roles of localities and societal actors in improving policy learning. Our identification of the tensions in the central-local relations particularly highlights the prioritised areas for improvement.

Based on our comparative case-study of three provinces which differ in their socio-economic and political contexts, we expect our findings can be generalised to other Chinese provinces. This study has therefore contributed to the literature of policy learning by shedding light on the mechanisms, in the Chinese context at least, of policy learning. Our findings are however country- and sector-specific. How far our findings are transferable from China to other economies, and from wind energy to other renewable energy sources such as solar and bioenergy are areas that requires further empirical investigation.

Figure 1: The national-level choices and local diversity of the pricing policies for wind energy in China
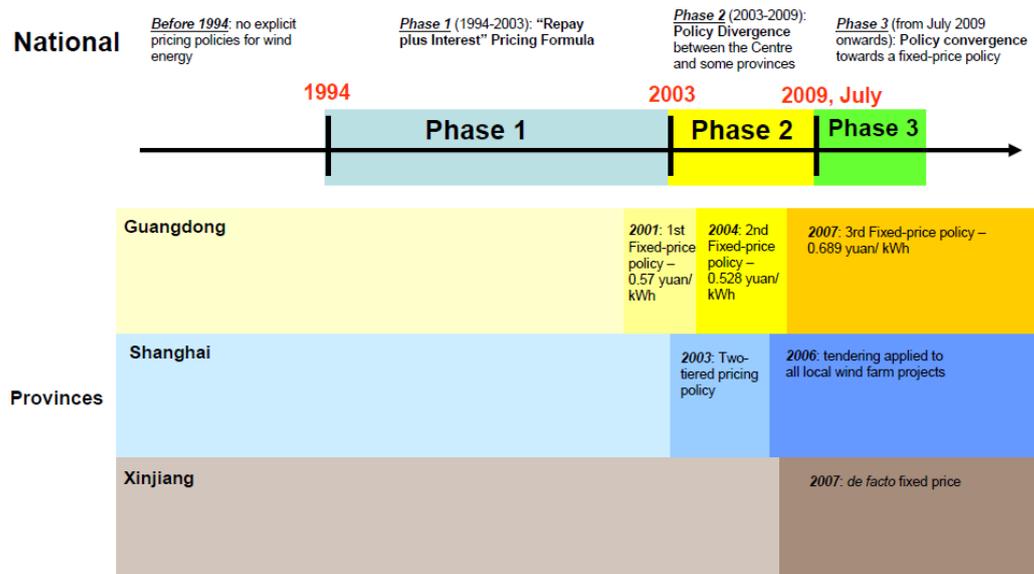
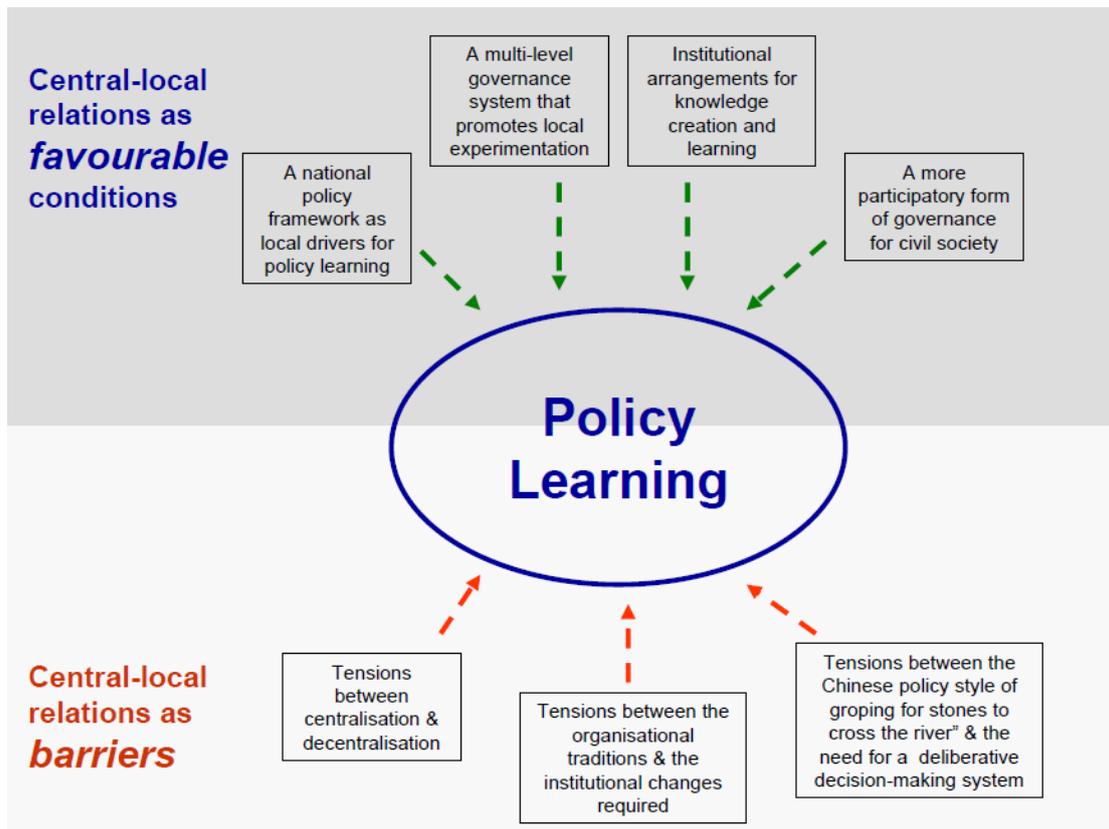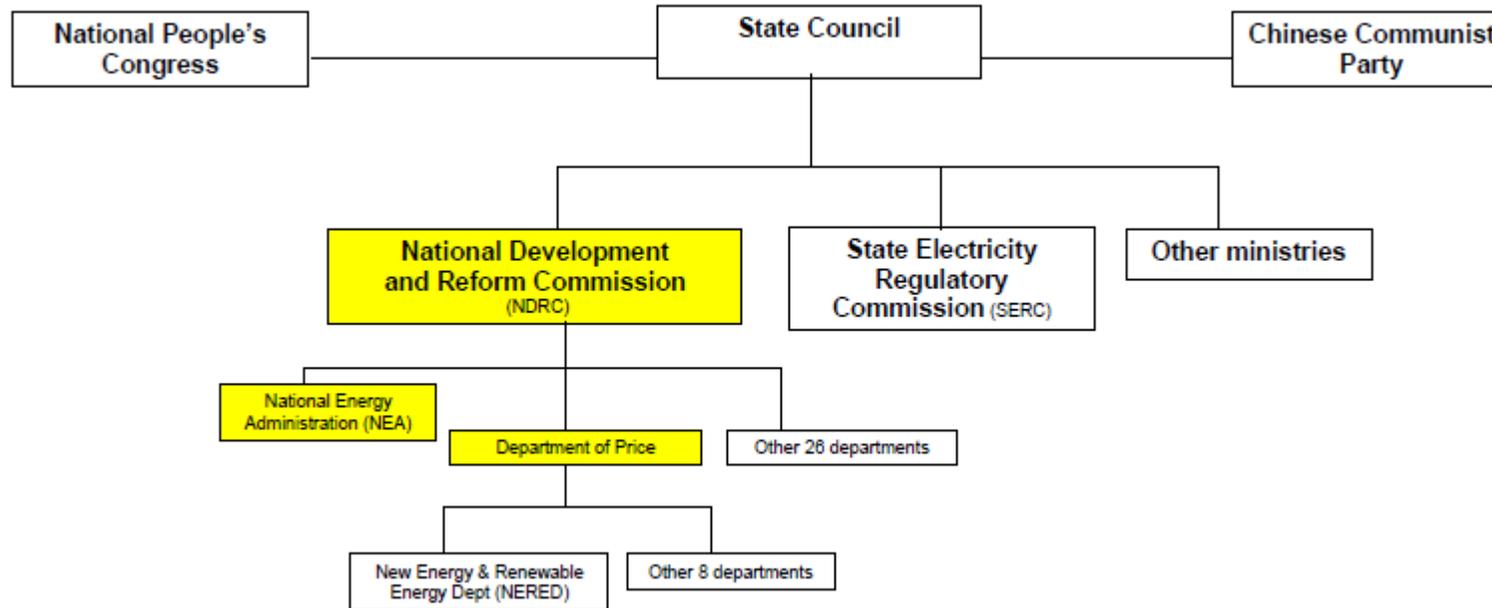Figure 2: A model of the effect of central-local relations on policy learning

Figure 3: China's fragmented bureaucratic structure for energy policymaking

(Sources: authors; Data: website of the Central People's Government of the People's Republic of China, from www.gov.cn, accessed on March 1, 2011; adapted from Mah and Hills, 2008)

<u>Appendix</u>

<div align="center"><u>List of Interviews</u></div>

Code	Interviewees Background	Types of interview	Date of interview
BJ/01/2009	Shi Pengfei, Vice President, Chinese Renewable Energy Industries Association; Senior Engineer (Professor), China Hydropower Engineering Consulting Group Co.	FI	Oct, 2009
BJ/02/2009	A Chinese wind energy expert who is affiliated to the National Development and Reform Commission	FI	Oct, 2009
BJ/03/2009	A senior official, New Energy and Renewable Energy Department, National Energy Administration, National Development and Reform Commission	FI	Oct, 2009
BJ/04/2009	Liu Shuang, Campaign, Greenpeace China	FI	Oct, 2009
GD/01/2008	Yu, Hongying, Committee member of the China Wind Energy Association, and a former manager of a wind farm in Guangdong, a former manager of Guangdong Yudean Group Co. Ltd.	TI	Jan 4, 2008
GD/02/2008	A senior manager of Guangdong Ji Hua Wind Energy Company Limited, who has been involved in both the projects of Honghaiwan Wind Farm and the Jiadong Wind Farm	TI	Jan 4, 2008
SH/1/2008	A senior executive of Shanghai Electric Power Company	FI	Jun , 2008
SH/2/2008	An anonymous mid-rank official, Energy Development Department, Shanghai Municipal Development and Reform Commission	FI	Jun , 2008
SH/03/2006	Dr Zhao Huiyu, Law School, Shanghai Jiao Tong University	FI	Sep 27, 2006
SH/09/2006	Zhou, Guoping, Director, General Research Division, The Development Research Centre of Shanghai Municipal Government	FI	Sep 28, 2006
XJ/01/2008	Yu Wuming, former general manager of Xinjiang Wind Energy Company; the deputy director of NWTC; and a expert to XJ government	FI	Oct, 2008
XJ/02/2008	A professor, Department of Public Administration, Xinjiang University	FI	Oct 23, 2008

* As some interviewees agreed to be interviewed only anonymously, this study indicates interviews by number. The first two letters indicate the location (BJ for Beijing, XJ for Xinjiang, SH for Shanghai and GD for Guangdong), the two digits indicate the interview numbers, and that followed by the year of interviews. The interview formats included face-to-face interview (FI) and telephone interview (TI).

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