

**Analyzing the Influence of Major Actors in China's
Renewable Energy Policy Process as a Means of Predicting
Future Chinese Renewable Energy Policy Trends**

By Michelle Hung Wai Lee

A thesis submitted
In partial fulfillment of the requirements
For the degree of
Masters of Science (Natural Resources and Environment)
In the University of Michigan
April 2012

Thesis Committee:

Ming Xu, Assistant Professor (Chair)
Shaopeng Huang, Associate Research Scientist

Acknowledgements

The author expresses thanks to her Thesis Advisors, Assistant Professor Xu Ming and Associate Research Scientist Huang Shaopeng; as well as Associate Professor Mary Gallagher from the Center for Chinese Studies; and Assistant Professor Yuen Yuen Ang from the Department of Political Science for their invaluable advice, patience and guidance. Special thanks to my parents, for supporting me through Graduate School. Any errors in this thesis are the author's own.

Abstract

This thesis identified seven major actors involved in the renewable energy policy process in China, and evaluated their relative levels of influence over the entire process, from drafting to implementation. The research aimed to tease out important actors and their means of influencing policy. The thesis employed a policy analysis framework adapted from Yaffee (2011) that observes each actor's motivations, resources and strategies.

The research revealed that the Chinese Communist Party still possesses the greatest amount of influence over policy-making, followed by government sponsored think tanks. Market-based enterprises—central state-owned enterprises (SOEs) and private firms—as well as the local government are a significant force. Ministries brought up the rear. The results are in contrast to a theoretical understanding of flows of power and influence in Chinese politics. The differences between the “theoretical” and “real” levels of influence each actor possesses vis-à-vis one another have several repercussions for the future of renewable energy policy in China.

First and foremost, the thesis posits that the ideological Party's motivation to retain control will result in them exerting more influence over the entire policy process, particularly by maintaining its embedded-ness throughout the entire policy process. Secondly, the ministries' low level of true influence in the policy process will require the central government to rethink the roles and resources made available to the ministries, and possibly establish a Ministry of Energy to preside over all energy matters. Lastly, the rising influence of market-based enterprises, shown by the analysis of central SOEs in the hydropower industry and private enterprises in the solar water heating industry, indicates a clear shift towards a market-based approach from planning. This shift, if continuous, will lead to enterprises being able to influence renewable energy policy to their greater advantage in the near future.

Table of Contents

PREFACE

TITLE PAGE	
ACKNOWLEDGEMENTS	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
COMMON ABBREVIATIONS	v

1.0 INTRODUCTION

1.1 RESEARCH QUESTIONS	1
1.2 CHINA'S ENERGY SECTOR	3
1.3 CHINA'S RENEWABLE ENERGY MOTIVATIONS	7
1.4 RENEWABLE ENERGY IN CHINA	10
1.4.1 Hydropower	11
1.4.2 Solar	12
1.4.3 Wind	12
1.4.4 Biomass	13
1.4.5 Geothermal	13
1.4.6 Ocean Energy	14
1.5 CHINA'S POLICIES AND POLICY LEVELS	14
1.6 CHINA'S PLANNING CHARACTERISTIC	18
1.7 SECTION SUMMARY	20

2.0 ACTOR IDENTIFICATION AND ANALYSIS

2.1 CHINESE COMMUNIST PARTY STRUCTURE	24
2.1.1 Politburo Standing Committee	35
2.1.2 Paramount Leader	42
2.2 GOVERNMENT STRUCTURE	36
2.2.1 Central Government	36
2.2.1.1 Leading Small Groups	44
2.2.1.2 Ministries	46
2.2.1.3 Government Sponsored Think Tanks	52
2.2.2 Local Government	48
2.3 ENTERPRISES	54
2.3.1 Central State-owned Enterprises	54
2.3.2 Private Enterprises	61
2.4 SECTION SUMMARY	65

3.0 CASE STUDIES	67
3.1 HYDROPOWER	67
3.2 SOLAR WATER HEATER	75
3.3 SECTION SUMMARY	85
4.0 EVALUATION	87
4.1 COMPARISON OF RELATIVE INFLUENCE OVER THE POLICY PROCESS	87
5.0 CONCLUSIONS	91
5.1 SUMMARY AND RECOMMENDATIONS	91
5.2 LIMITATIONS AND FUTURE RESEARCH	93
6.0 APPENDIX	96
6.1 TOTAL PRODUCTION OF ENERGY AND ITS COMPOSITION IN CHINA	96
6.2 SUMMARY OF FIVE YEAR PLANS	97
7.0 REFERENCES	98

Common Abbreviations

CCP	Chinese Communist Party
CNREC	China National Renewable Energy Center
CTGPC	China Three Gorges Project Company
EIA	Environmental Impact Assessment
FYP	Five Year Plan
GDP	Gross Domestic Product
GSTT	Government Sponsored Think Tanks
kWh	Kilowatt Hour
LSG	Leading Small Group
MZT	Mao Zedong Thought
NDRC	National Development & Reform Commission
NEA	National Energy Administration
NEB	National Energy Bureau (defunct)
NEC	National Energy Commission
NELG	National Energy Leading Group
NGO	Non-government Organization
NOC	National Oil Companies
NPC	National People's Congress
PBSC	Politburo Standing Committee
PLA	People's Liberation Army
PRC	People's Republic of China
PV	Solar Photovoltaic
REL	Renewable Energy Law
SASAC	State-owned Assets Supervision and Administration Commission
SDC	Scientific Development Concept
SEPA	State Environmental Protection Administration
SWH	Solar Water Heating
SOE	State-owned Enterprise
tce	Tons of coal equivalent

1.0 Introduction

1.1 Research Question

Renewable energy experts and China observers both in China and internationally find the Chinese renewable energy industry fascinating for several reasons.

Undoubtedly, the deep entrenchment of the Chinese Communist Party within the government structure, along with the duo's sense of secrecy makes China watching so interesting. Like a good murder thriller, information is never presented straightforward, but must be deduced from piecing together information from various sources and timelines in order to create a general sense of future trends of anything in China. Even expert Zhongnanhai watchers cannot claim to understand the mechanism of the political structure, and must resort to guesswork and mutual agreement with one another to explain various political scenarios.

The renewable energy industry in China is a fascinating arena to study, primarily because China has become the largest greenhouse gas emitter in the world (Buckley, 2010; Li, 2011), and hence the largest contributor to climate change in the global commons. With projected increases in China's energy demand coming from growing middle and upper classes, as well as extensive rural electrification projects and industrial development, the focus of policy-makers, both in China and internationally, is on China to *do something*, quickly.

China has also become the world leader in production and export of renewable energy products such as wind turbines, solar photovoltaic (PV) cells, solar water heating (SWH) equipment, and hydropower know-how. The world will be looking more closely at renewable energy policy promulgation for cues on how they should respond to China's actions in the renewable energy sector, and what they should be doing to imitate its success, or simply to defend its own interests. Even minor

changes in the policies pertaining to China's renewable energy arena can amount to significant repercussions globally.

Understanding how the policy process works is important because policies are developed as a response to the existence of perceived problems, or opportunities to be had (Rodrigues, Comtois & Slack, 2009). Analysis of policies and their development process thus provides a useful indicator of how serious the problem is perceived to be, and the promulgator's level of interest or disinterest in the issue.

In China's renewable energy case, growing the renewable energy sector is perceived as both a solution to problems (such as energy security, environmental degradation and job creation) and also as an opportunity to support economic growth in China and as a means for the government to maintain its control over the nation.

One aspect to understanding the policy process is identifying the stakeholders and their contributions to the policy process. The analysis of stakeholders is quite indivisible from understanding the policy process, as it is the stakeholders who help to shape the policy, and who are impacted by the policies made. In order to maintain focus on the research, this thesis will only analyze the major stakeholders involved.

According to Saich (2011), bargaining and negotiations are important elements in the Chinese policy process. Consensus-building has become the order of the day, such that even after a policy is adopted, negotiations do not cease, leading to possible changes made to the original policy.

This thesis attempts to move one step forward from simply analyzing major actors, and try to evaluate the relative levels of influence the various major actors have in the renewable energy policy process.

In Section 2, major actors identified during the research process are analyzed in terms of their motivations, resources and strategies for inhibiting or promoting the renewable energy policy process. These actors span from individuals in the government and Party, to government agencies, and to companies. Teasing out their

motivations help observers understand more about their incentives for renewable energy policies, which includes laws, regulations and rules, or the reasons why they resist policy promulgation. However, in order for motivations to be carried out into meaningful action, they need to have sufficient quantity and quality of resources. These resources range from the intangibles— time and networks (*guanxi*)—to physical items such as money and manpower. Together, their resources and motivations are utilized through strategies devised.

Section 3 provides several renewable energy examples of how the motivations, resources and strategies of the identified actors in Section 2 come into play. The hydropower and solar PV industries were selected not only because they cover a range of actors, but also because their development timeline covers a range of eras, from liberalization in 1949, to structural reform during the late 1990s. The two industries have since matured and successful in part due to the major actors' involvement in the policy process.

Given some concrete examples of actor's influence in several renewable energy industries, Section 4 thus evaluates the identified actors in terms of their overall influence over renewable energy promulgation.

In doing so, the author hopes that this thesis will be useful for people interested in predicting future trends in China's renewable energy industry, and also people interested in understanding what changes should be made to make renewable energy policy in China more efficient and effective.

1.2 China's Energy Sector

In 2010, China overtook the U.S. as the world's top energy consumer. According to the 60th annual Statistical Review of World Energy by British Petroleum (China World's Top Energy Consumer, 2011) and the International Energy Agency (Swartz & Oster, 2010), China accounted for 20.3% of energy demand, in comparison to 19.0% by the U.S. Fueled by decades-long economic expansion and industrial

growth, the reports expect China to continue holding this record, as energy consumption increase for the year 2010 by the developing nation (11.2%) far surpassed the global average (5.6%) and the U.S. (3.7%).

Data available from National Bureau of Statistics of China (National Bureau of Statistics of China, 2010) indicates that since the early 1970s, China's energy production has consistently included a large percentage of coal (ranging from 69.0-77.8%), followed by crude oil (9.9-23.8%), and a smattering of natural gas (1.9-4.1%) and non-fossil fuels, which comprises of wind power, nuclear and hydropower (3.1-8.7%). However, the omission of biomass is glaring. Over 720 million Chinese, or about 60% of the population, live in rural areas, where biomass is the primary source of energy.

China's energy resources are substantial: proven coal reserves in China account for 13.5% of total world stocks, while natural gas stocks account for 1.1% of world total (Ma et al., 2009). The ratio of energy production to stocks is 118 and 27.2 years for coal and natural gas, respectively. Technically recoverable petroleum reserves are declining, and Chinese petroleum reserves currently only account for 1.3% of the world's total (Ma et al., 2009).

China also possesses significant renewable energy resources. The total economically exploitable renewable energy resources account for approximately 7.2 billion tce, of which only 0.1 billion tce are currently being utilized (Ma et al., 2009). The hydropower resources in China are unparalleled in the world, and total technically installed capacity of China's water resources is 542GW, equivalent to an annual power generation capacity of 2.37 trillion kWh (Worldwatch Report 182), of which only 595 billion kWh has been exploited (Worldwatch Report 182).

In addition to domestic reserves, China has become a net oil importer and is currently the third largest importing country in the world, behind Japan and the U.S. (Crisis Group Asia, 2008). China has in recent years gone on a diplomatic spree in the Middle East and Africa to ensure access to oil in these tumultuous times. For example, since 2002, China has been the largest recipient of oil from the Kingdom of

Saudi Arabia, who has repeatedly assured that they will not stop the flow of oil into China (Downs, 2012).

Despite substantial energy resources and fruitful diplomatic relations, there are several impending problems in the energy sector that China faces.

Firstly, traditional energy resources are located far from locations of high demand. China's coal resources are distributed very unevenly across the nation; most major deposits are located in the North, Southwest and Northwest (Ma, et al., 2009), while coal demand is highest in the Southeast, where energy-intensive industries are located. Hence, the cost of transporting coal to these coastal regions mainly by train or heavy duty trucks, is increasingly high. In addition, pollution occurs along the transportation routes, and much of the integral transportation network required for coal is antiquated, requiring capital intensive overhaul to improve the transportation network and enhance transport capacity.

Secondly, low levels of energy efficiency are imposing a burden on the energy provision sector. Steven Chu, the U.S. Secretary of the Department of Energy, has famously called energy efficiency "not just low hanging fruit; it is fruit that is lying on the ground" (Morelli, 2009; "Energy Efficiency is Not Just Low-hanging Fruit", 2009), and it is the same case for China. However, the large size of the country, as well as low levels of monitoring has resulted in slow uptake of energy efficiency measures. In order to compensate for low energy efficiency levels, China has to increase the energy supply to ensure that its industries are able to function.

Thirdly, China needs to increase its energy security. China's high dependency on coal, as noted in the energy production portfolio above, and dependence on diplomacy and gifts of financial aid and technology exchange for promises of oil, in addition to the low levels of improvement in energy efficiency foreshadows potential energy problems in the future. Barring technical limitations and political tussles, developing its domestic energy reserves has always been China's priority (Crisis Group Asia, 2008).

China is also well aware of the country's burgeoning appetite for energy— an expanding population, rising standards of living, massive urban migration of the rural poor and a growing industry sector— meaning that China may face impending energy shortages that can hamper its economic growth, as well as turn into public dissent towards the government. Maintaining political stability in such a large country will require firm control over the energy sector.

International pressure on China—the world's factory— is mounting, on the fact that China is the largest emitter of carbon dioxide from fossil fuels. The Energy Information Administration reported that China emitted 7,711 million tons of CO₂ in 2009, more than the entire North America, or Europe and the Middle East combined (Rogers & Evans, 2011).

Lastly, China political experts have weighed in on the need for a Ministry of Energy to oversee the entire energy sector. Currently, energy prices are regulated by the National Development and Reform Commission (NDRC), while hydropower development is managed by the Ministry of Water Resources and the national oil companies (NOC) are in charge of oil exploration and procurement. The immense fractioning of the energy sector has led to political in-fighting as each agency rejects the need for another government agency, in an act to defend its own interests and autonomy, thus preventing China as a whole to effectively and efficiently guide and further develop its energy sector.

While the renewable energy sector helps to alleviate many of its problems such as moving away from a heavy-industry intensive economy, environmental pollution and energy security, it is not a panacea for all of China's woes.

The recent international economic crises show that the renewable energy sector is vulnerable to external market forces out of the government's control. The impact of the economic crises caused demand for renewable energy products to plummet, hitting the renewable energy industry hard. The lack of sufficient control is undesirable to the central government, who might consider resorting to implementing more policies to extend financial support to the burgeoning industry.

However, this must be carefully weighed in consideration to the global audience, especially German and American renewable energy companies who complain about “China prices”.

Low domestic uptake of renewable energy technologies also affects China. There is a need to improve energy security and create a domestic market large enough to buffer impacts of possible future international economic crises, but the low costs of traditional sources of energy makes it difficult to make a case for local grids to switch to more expensive renewable energy sources. While tools such as feed-in tariffs have enabled some movement towards renewables, the government is aware that more needs to be done.

1.3 China’s Renewable Energy Motivations

Section 1.2 briefly mentioned the current energy situation in China. More noticeable are the energy problems that China faces, leading to the Party and government looking beyond traditional energy sources to solve their problems.

Energy security is a critical issue for China. Since the economic reforms in 1978, China’s economic growth averages 9.8% annually, and much of this economic growth is dependent on highly energy-intensive industries (Jing, 2011). Although China is attempting to shift away from such industries, a growing population and increasing rural-urban migration pattern will force China to keep many of these industries open. Additionally, the burgeoning size of the energy-hungry upper-class households longing for the material comforts of additional electrical appliances threatens to add to the strain on traditional energy sources.

In order for China to continue its rapid economic growth and appease its citizens, not only will it need to find a way to increase energy efficiency, it will need to change its current energy consumption pattern.

The level of environmental pollution caused by burning large amounts of coal in China is also tremendous. Streets and Waldoff (2000) analyzed the present and future emissions of several types of air pollutants in China, and found that amongst other startling results, with emissions controls implemented on major power plants, sulfur dioxide emissions are projected to increase by 21% from 1995 to 2020. Without the emissions controls, emissions could increase by as much as 141%.

On the topic of greenhouse gases, Streets and Waldoff (2000) also found that nitrogen oxide emissions in China were projected to increase by as much as 148% from a 1995 base, with the power sector guilty of being the second largest contributor of nitrogen oxide emissions.

These motivations for greater emphasis on domestic renewable energy production have culminated in the promulgation of two renewable energy targets set by the central government.

The first is within the 12th Five Year Plan (FYP) established by the central government in 2011. FYPs are a series of roadmaps produced by the top levels of leadership in China for consolidating and disseminating important social and economic policy goals to lower levels in the Party and government hierarchy system (Downs, 2008a). In essence, they are “key indicators of the directions and changes in development philosophy” (Kasey & Koleski, 2011).

Chapter 3 of the 12th FYP on *Main Targets* states that the government has set a binding target for increasing non-fossil fuel energy to 11.4% of total energy use by 2015, up from 8.3% in 2010 (China’s Twelfth Five Year Plan, 2012). The status of “binding target” indicates the strong political will and commitment of the central government in reaching this goal. However, the phrase “non-fossil fuel energy” indicates the inclusion of nuclear energy by the central government. Hence, the true impact on the renewables sector is unclear.

The second renewable energy target is located in the Renewable Energy Law (REL), approved by China’s State Council under the National People’s Congress (NPC) in

2005. The REL is a comprehensive umbrella law that focuses on the development and promotion of renewable energy. The REL is essentially a mandate by the NPC to provincial governments to increase renewable energy purchase by developing location-specific financial instruments such as feed-in tariffs and quotas (RELaw Assist, 2007).

According to the REL, the target for 2020 is to obtain 15% of total energy from non-fossil fuels (National Development and Reform Commission, 2007; China's 12th Five Year Plan: Overview, 2011). Table 1 below shows a breakdown of the targeted utilization of each individual clean energy resource.

Table 1: China's Renewable Energy Targets in the Medium and Long Term¹

Resource	2006 Actual	2010 Target	2020 Target
Total hydropower (GW)	130	190	300
Small hydropower (GW)	47	60	85
Grid-connected wind power (GW)	2.6	5	30
Biomass power (GW)	2.0	5.5	30
Solar PV (GW)	0.08	0.3	1.8
Solar Hot Water (million m²)	100	150	300
Ethanol (million tons)	1	2	10
Biodiesel (million tons)	0.05	0.2	2
Biomass pellets (million tons)	<1	1	50
Biogas and biomass gasification (billion m³)	8	19	44

These renewable energy targets are a vital clue to comprehending the emphasis that the Chinese Communist Party (CCP) and government wishes to put on promoting renewable energy. However, the various types of policies, the relative levels of influence of the main actors, as well as their resources, motivations and strategies or

¹ Data source: "Medium and Long-Term Development Plan for Renewable Energy in China", National Development and Reform Commission, Beijing, September 2007. Table adapted from "Powering China's Development: The Role of Renewable Energy", Worldwatch Report 175. Authored by Eric Martinot and Li Junfeng.

lack thereof will dictate how the policies are shaped, and whether these renewable energy targets will be met.

1.4 Renewable Energy in China

Renewable energy comes from natural sources that are constant and can be naturally replenished. According to the 12th FYP of China, the country is dedicated to promoting the development of new energy sources domestically. The “new energy” term encompasses nuclear, solar, wind and biomass and geothermal energy, and can be used interchangeably with the term “non-fossil fuels” (非化石燃料). “Renewable energy” (可再生能源), as defined in China’s REL, includes wind, solar, hydropower, biomass, geothermal and ocean energy (The Renewable Energy Law, 2009).

The difference between the terms “renewable energy” and “non-fossil fuels” is important to note. The REL has indicated the central government’s commitment to striving towards 15% of primary energy coming from renewable sources. However, in a speech given by President Hu Jintao at the United National Climate Summit in September 2009, Ma (2011) carefully noted that the 15% energy goal that Hu mentioned, alluding to what most of the Western audience assumed as a reiteration of the REL goal, was in fact of non-fossil fuels in primary energy consumption, and not renewable energy².

Renewable energy use is not a new phenomenon in China. Hydropower has been long and well established in China, with early investments in hydropower

² In “Renewable Energy Policy Update for China”, July 21, 2010, authors Martinot and Li write that the target set in 2006 for share of primary energy to come from renewable sources by 2020 to hit 15% was revised in two ways: firstly that “primary energy” was altered to “final energy consumption” as an adoption of European Union accounting practices. Secondly, the alteration of “renewables” to “non-fossil-fuel sources” will lessen the effect of the law on renewable energies.

deployment dating back to the 1949—the initial year of the CCP rule. By the early 1950s, a variety of micro-hydro and biogas programs were launched (Mastny, 2010). However, renewable energy innovation slowed soon after, and it was not until the 1980s that government support for other renewable energy sources, including solar, begun, and only during the last decade that serious deployment occurred.

The renewable energy sector has made a dramatic comeback. In 2008, the renewable energy sector accounted for 9% of the country's total primary energy use, a 1.5% increase from 2005. That translates to 250million tce. Hydropower is the main contributor to the renewable energy pie, followed by solar and wind.

1.4.1 Hydropower

Hydropower can be categorized into large and small hydropower according to the capacity of the installation. Small hydropower is defined as installations with capacity of less than 50MW, and is often referred to as “rural hydropower”, as it is a valuable energy resource in rural areas (Mastny, 2010). Approximately half of the rural territories, one third of counties and a quarter of the total rural population's electricity needs are met by small hydropower (Ma et al., 2009).

According to the China's Energy Development Report 2009 (Li & Ma, 2009), the technically exploitable installed capacity of China's water resources is 542GW, of which 400GW is economically exploitable. As of 2009, only 49% of the economically exploitable resources have been utilized, and even though the size of economically exploitable hydropower resources is set to increase due to advances in technical and engineering capabilities, with favorable government policies, the percentage is set to grow.

1.4.2 Solar

Solar power can be categorized into solar photovoltaic (Solar PV) and solar thermal heaters. Solar thermal heating comprises of space heating, SWH, drying, cooking etc. For brevity, this thesis will look at the SWH portion of solar thermal heating systems.

China is fortunate to possess vast areas with favorable insolation. By taking into account China's total roof area and implementing only 2% of desert area, China has at its disposal the ability to install over 22,000 square kilometers of solar PV systems, with a total power generation capacity of 2,200GW, or 2.9 trillion kWh of annual electricity output (Mastny, 2010).

Together with government support and low manufacturing costs, China's PV market has become the world's largest solar PV producer, surpassing Germany, Japan and the U.S. Despite its market position and abundant sunlight, less than 50MW of solar PV systems were installed domestically in 2008, while 98% of its products were exported.

The effect that the past economic crises had on the solar PV market showed the importance of developing a local market, and the Chinese government is encouraging domestic uptake of solar PV.

SWH is a mature clean energy technology that has become integrated in the Chinese economy. A reliable and economical method of generating hot water, according to a recent survey, nearly 1 in 10 households in China own at least one SWH. China is the world's leading manufacturer of SWH, with over thousand SWH manufacturers (Li, 2005), and also holds 95% of the rights for solar thermal technology (Clean Energy, 2008).

Many scholars argue that SWH is still far from saturation point, and there is great potential for SWH to become an important contributor to the clean energy pie.

1.4.3 Wind

The Chinese Academy of Engineering posits that China has total technically exploitable wind energy resources of 70-1,200GW, of which only 172GW has been developed (Mastny, 2010). Despite coming late to the game in comparison to hydropower and biomass use, wind power has surged ahead to become the fastest-growing clean energy technology in China. However, even with all the growth in the wind power industry, China still lags behind other countries in terms of installed capacity.

1.4.4 Biomass

Biomass is an important energy resource in China. Most rural families still cook using biomass as fuel, and an estimated 90% of rural families currently use improved biomass stoves, a more efficient technology (Mastny, 2010).

In 2008, the installed capacity of biomass power in China was just over 3GW, a 0.8% increase from two years ago. Problems with the production of biofuel from food feedstock had led to government restriction on bioethanol production, but they had since cleared, and the 2005 REL has specifically encouraged ethanol production (Martinot & Li, 2007). Although the Chinese biogas technology is advanced, other bioenergy applications are still in the early stages of development.

1.4.5 Geothermal

Geothermal energy can be categorized into shallow and deep geothermal. Shallow geothermal is used primarily for space heating, while deep geothermal is used for electricity generation, and is often cascaded to allow for multiple uses of the same hot water. By 2009, China's shallow geothermal application for space heating reached 30 million square meters, and total deep geothermal installed capacity reached 9GW (Mastny, 2010).

Although China has had a long history of geothermal energy use dating back several centuries, the potentials for widespread utilization is limited, with most of its resources existing in remote areas such as Tibet and upper reaches of Yunnan (Taylor & Li, 1996). For that reason, geothermal energy production is not high on the list of prioritized clean energy resources.

1.4.6 Ocean Energy

Due to technical barriers, ocean energy has not been tapped. However, with China's extensive coastline of the mainland and also its islands, the 1,000GW of recoverable energy resources has motivated the government to actively engage in pilot and demonstration stages of ocean energy exploitation.

Not only does China have great exploitation potential for its abundant renewable energy resources, the technology today allows electricity generated from renewable

energy sources to compete quite convincingly against electricity generated from conventional electricity prices. The table below shows that by 2009, hydroelectricity has become a cheaper source of electricity generation than traditional coal. With future technological improvement, it is only a matter of time before the other renewable energy resources hit grid parity, or slid below it.

Table 2: China On-grid Electricity Price in 2009

Energy Source	On-grid Power Price (Yuan/kWh)	On-grid Power Price (USD/kWh)*
Hydropower	0.265	0.0388
Coal-fired power	0.35	0.0512
Nuclear power	0.44	0.0644
Wind Power	0.56	0.0820
PV power	1.5	0.220

Source: Frost & Sullivan. www.newenergy.org.cn/html/0105/5171032525.html

* Using average 2009 exchange rate of 6.83 Yuan to the Dollar

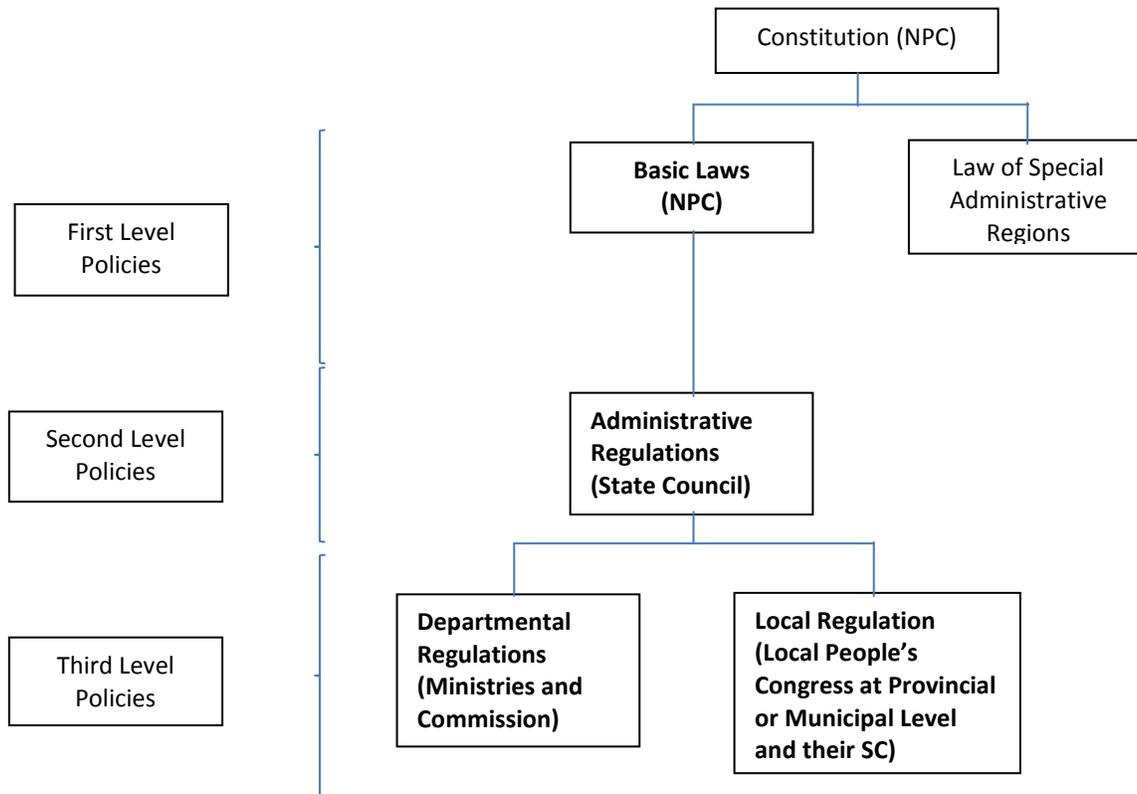
1.5 China's Policies and Policy Levels

China's policy-making process has undergone much change since its liberalization in 1949. In the past, policy decisions were made and carried out primarily by a small group of trusted CCP elites (Lieberthal, 2004). The opaque policy process has since evolved to include different organizations and people at the different stages of policy making and implementation. To understand the policy process, the various types of policies must first be dissected.

In general, there are four types of Chinese policies that are made on three levels in ascending order of authority: the first level of policy are promulgated by the central government, the second by the State Council, and the third consists of policies by the ministries, commissions and local governments, which include provincial, municipal and county governments. The local government is also in charge of implementing all three levels of policy locally.

This thesis will only focus on the policy types indicated below in bold.

Figure 1: Policy-making Hierarchy in China³



The first level policies are called **basic laws** (法律), (Guidance Notes, no date) and give general direction and guidance for the entire country by consolidating and disseminating important social and economic policy goals to lower levels in the Party and government hierarchy system (Downs, 2008b; Renewable Energy in China, 2004). They are often considered vague, and leave much room for interpretation when it comes to policy implementation. In that respect, first level policies are often dismissed by policy observers for more concrete policies to be

³ Figure adapted from RELaw Assist. "Renewable Energy Law in China- Issues Paper". 2007. Baker & McKenzie.

promulgated. However, it is important to realize that these policies are often used to reiterate or clarify the government's standpoint on issues, and as platforms on which more area-specific policies are developed.

Some examples of first level policies targeted at the renewable energy industry include China Agenda 21 (implemented in 1992), the Energy Saving Law (1997) and perhaps the most important, the Renewable Energy Promotion Law (2003) (*Renewable Energy in China*, 2004). The Five-Year Plans, a series of roadmaps that lay down the central government's objectives and goals for the next five years and often includes the energy sector, is also an important set of first level policies. In essence, they are "key indicators of the directions and changes in development philosophy" (Kasey & Koleski, 2011). An outline of the key points of each FYP can be found in section 5.3 of the appendix.

Second level policies, called **administrative regulations** (行政法规), (Guidance Notes, no date) are issued by the State Council. Together with the third level regulations, they constitute the "heart" of China's administrative-legal system (Guidance Notes, no date).

The administrative regulations are issued by the State Council and attempt to provide more specification on the first-level policies. Drafted by ministries and other organizations under the purview of the central government, after they are accepted by the NPC and State Council, they are implemented as national laws. On administrative regulations, Tao Gang, VP of China's largest wind turbine producer, has reportedly commented that "[t]he State Council has defined the strategic position of clean energy industries. This will ensure long-term stability of policies essential to clean energy businesses" (Who's Winning the Clean Energy Race, 2010).

Additional examples of second level policies include the Brightness Program (1994) and the Golden Sun Program (2009) (*Renewable Energy in China*, 2004).

Third Level policies consist of two types of policies: **departmental regulations** (部门规章) (Guidance Notes, no date) and **local regulations** (地方规章). Relevant

ministries implement departmental regulations while the local governments develop local regulations. Departmental regulations such as the Adjustment of value-added tax (VAT) for Some Resource Comprehensive Utilization Products by the Ministry of Finance and State Tax Administration, as well as the Township Electrification Program (both 2001), are examples of policies that demonstrate the specific methods of support that the central government is committed to providing.

Every year, hundreds of thousands of local regulations are promulgated and implemented at the local government level by local bureaus. The local bureaus, such as the provincially-administered development and reform commission, are important departments where national energy, environment and climate policies are implemented at the local level. Several examples of local regulations include provision of rebates by the local government to increase local uptake of more energy efficient or renewable energy equipment, and regulations on building codes and specific construction material.

Because such policies are frequently developed on the ground and often only implemented in specific provinces or economic zones, they are tailored to fit the locale and vary from place to place. Not surprisingly, they have the highest level of implementation success, and are credited with helping nurture several renewable energy industries especially during its infant stages.

1.6 China's Planning Characteristic

Planning is a characteristic of socialism, through which the state controls most of the means of production (Chow, 1988). It also shows the extent of the ideological Party's influence over the government system, and the country as a whole. The planned economy that existed in Communist China today dates back to the Soviet transformation of the Chinese government system immediately after Mao's victory and his liberalization of China.

The propaganda piece below shows the then-relationship between the Soviets and the Chinese on the basis of a shared ideology, and China's eagerness to develop a Soviet-style of central planning.

Figure 2: "Study the Advanced Production Experience of the Soviet Union. Struggle for the Industrialization of our Country" Artist: Li Zongjin

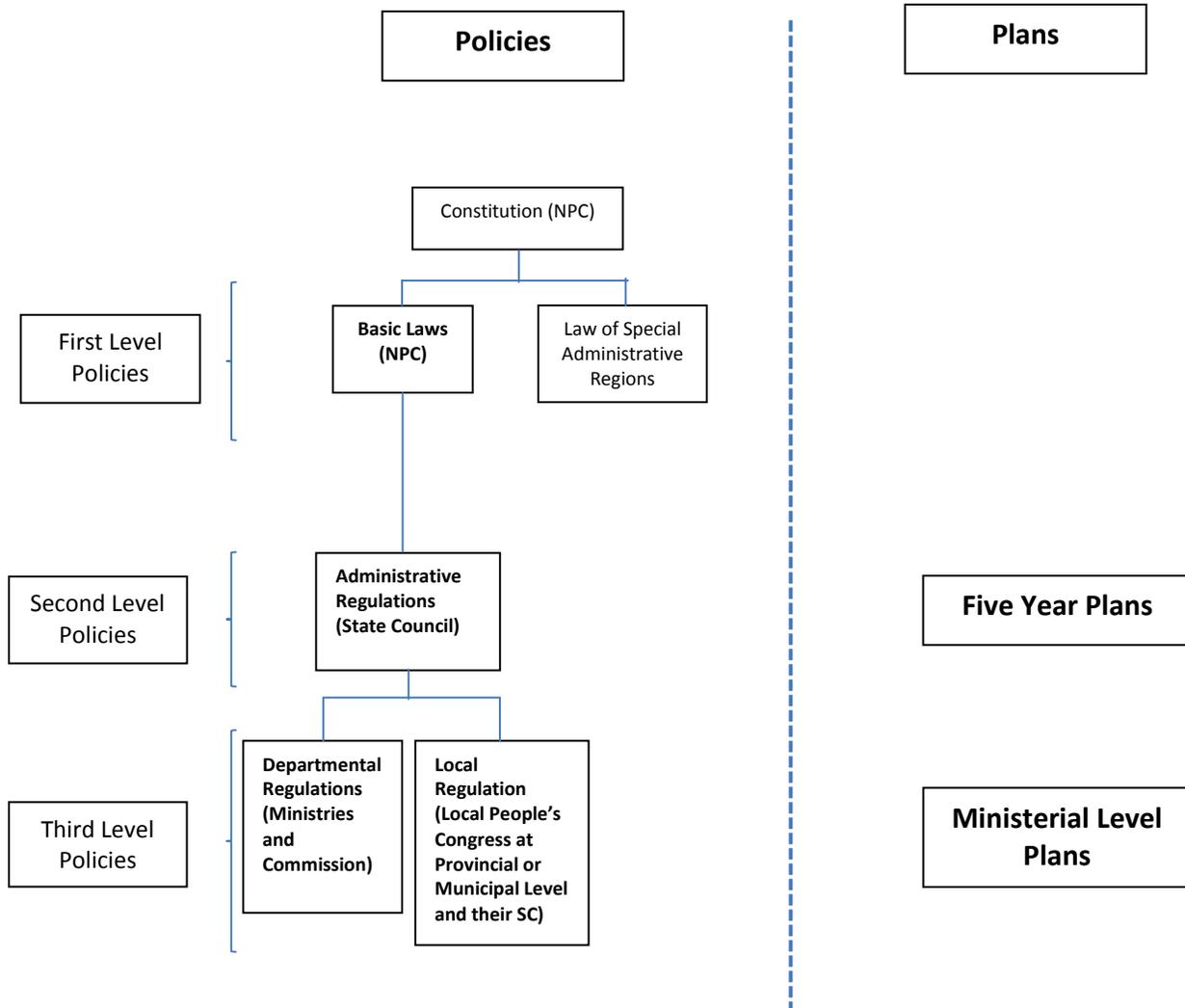


Source: Tucker, 2007

Since the waves of reform, central planning has given way for market forces to exert greater influence over production. While plans are still made by China's top policy-bodies and provide "broad-brush" (Lieberthal, 2004) guidance for China's development path, many argue that these plans provide detailed instructions dictating economic development and reform methods, are still considered crucial directives today. Indeed, Chow's (1988) argument more than twenty years ago that although China will not revert back to the former mode of Soviet-style central planning, its institutional structure will remain relatively unchanged stands true today.

The figure below shows the hierarchy of Plans, in comparison to policies.

Figure 3: Planning Hierarchy in China.



Together, plans and policies work in harmony together to ensure that the ideas of the Party are consolidated, conveyed and carried out in an appropriate manner throughout the whole of China.

The FYPs are an example of such plans promulgated by the CCP. These plans are a series of development initiatives of the economy and society over the next five years

under the incumbent leader's term. They often include goals and targets that the Party hopes to achieve through the government arm. Fittingly, both the Chinese and Western audience place a lot of emphasis on FYPs today, and these plans drive much of the development of Chinese policies.

The lower level of plans include the "Medium and Long Term Development Plan for Renewable Energy" in China and the "Five Year Plan for Renewable Energy". The former was put together by the NDRC, and lists guiding principles, objectives and targets, as well as priority sectors and national policies and measures (*Medium and Long Term*, 2007). The latter was drafted by the National Energy Administration (NEA) and submitted to the State Council in February this year (*The 12th Five-Year Plan*, 2012).

1.7 Section Summary

This section provided a general sense of China's development in the energy and governance fields from the past through to the present. The energy, societal and environmental problems that China faces today are not unique to China alone; and they have culminated into a strong internal desire for China to explore and support new sources of energy, of which renewables is a key sector. It has been technically proven that China has a vast amount of exploitable renewable energy resources. In order for them to be utilized prudently, careful and thorough policies need to be set in place, so as to guide the industry's development in a sustainable manner.

Section 1.6 briefly introduced the notion that China has not completely shaken free from its ideological background. The Plans are symbolic of the Party's hold on society. Even today, the CCP has strongholds in the government; an idea that will be explored in the following section. When thinking about policy planning and development in China, this is one aspect of the governance system that should not be forgotten.

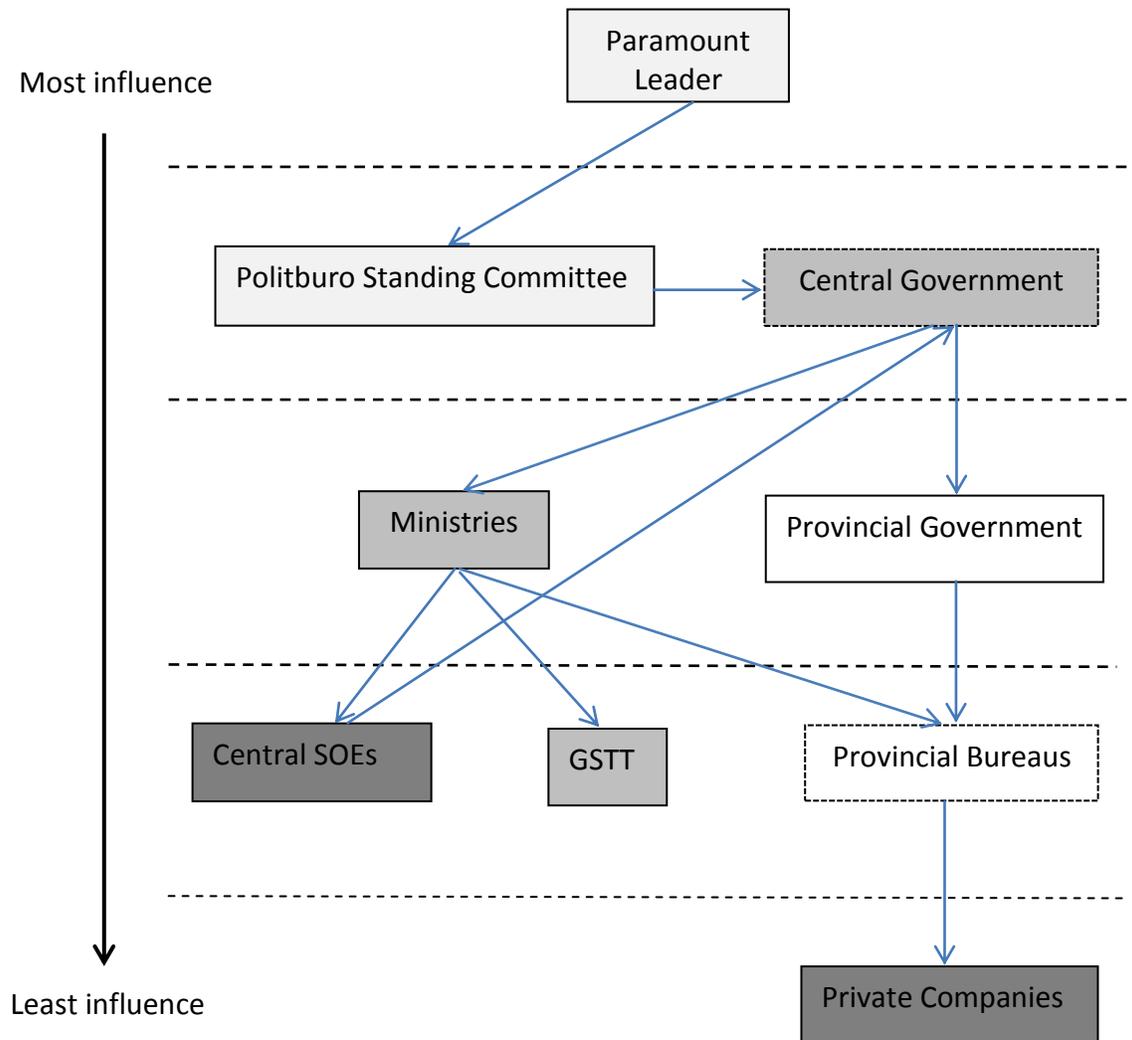
2.0 Actor Identification and Analysis

This section takes an in depth look at the major actors that have been identified through preliminary research. The flow chart below presents an overview on how the actors are ranked theoretically in terms of their levels of influence over the renewable energy policy process, and also their interactions with one another.

The actors are shaded according to a loose grouping: the CCP actors are the lightest shaded, followed by the central government in a medium shade, and the enterprises are darkly shaded. Only the actors in solid boxes will be analyzed; the boxes with the perforated sides were added to aid in providing connections between each actor.

The five levels of influence show the extent of hierarchy in Chinese politics, and provide some context into complexity of the policy process in China.

Figure 4. Theoretical Levels of Influence and Flow of Influence of the Major Actors in China’s Renewable Energy Policy-making Process.



The actors will be analyzed according to a political analysis framework offered by Yaffee (2011). This framework is particularly useful at paring influence over the political process down to the basics. For brevity and in the interest of keeping the analysis simple and straightforward, this thesis has adapted it to look at only three components of the political analysis framework: Motivation/Interests; Resources; and Strategies.

Motivations look at the interests of the organization leaders and the organization itself. These self-interests can be economic, psychological, purely political, or organization in nature. For example, an individual interested in political power and re-election will act in ways that will enhance his level of political power, or chances for re-election. These actions may complement or contradict other interests, such as the organization's interest for economic gains. Evaluating the motivations that drive actions can help us understand the strategies employed, and resource allocation and use.

Resources include items both physical, and intangible. Money, manpower, and land are examples of physical resources. The latter includes financial support, networks of relationships (*guanxi*), time, incumbency and legitimacy of the organization or person in question. Resources paint a picture of how much political capital an actor can stand to invest. A resource-poor actor will certainly have less political influence over the policy process than a resource-rich actor.

The last component in the political analysis framework looks at the actor's strategies for working towards achieving their motivations. These strategies include coalition building with other prominent actors, using their position within the policy process to block policy implementation or set up opposition, or, usurp the organizational responsibilities of competing organizations in order to reduce opposition.

2.1 Chinese Communist Party Structure

The political system devised comprises of two "vertically integrated, but interlocking institutions" (Martin, 2010), which are the CCP, headed by the Party Politburo and its Standing Committee; and the government apparatus, headed by the Premier. The Party and the government bodies, while separate in theory, are so closely integrated together that in reality the line between their different functions is often blurred.

The heavily centralized and top-down system created ensures that the CCP holds a great deal of power and control over the country. The Party is considered the ultimate decision maker when it comes to major policy issues, and its power over policy is spread out through party groups and party appointment system (Lewis, 2011). Indeed, Lieberthal (2004) suggests that the career mobility of all the elites outside the private sector is controlled tightly by the Communist Party. The section looking at State-owned Enterprises (SOE) as an actor will provide more detail on this article.

In addition to being decision-makers, the Party is able to influence the policy process at each level because of the parallel structure of the party and the government. This parallel structure ensures that party members often hold government positions and vice versa. Hence, these actors holding dual positions act as channels through which the Party ensures that its will is carried out.

Novice observers of Chinese politics are often confused by the notions of “theoretical” and “real” holders of power in the Chinese system of government. The main thrust between the real and theoretical bureaucratic hierarchy is the level of influence the different institutions wield on one another and their ability to make significant decisions that affect policy.

The two figures below provide a graphical description of the Party hierarchy as it is projected to the media, and the Party hierarchy in actuality.

Figure 5. Theoretical Party Hierarchy⁴

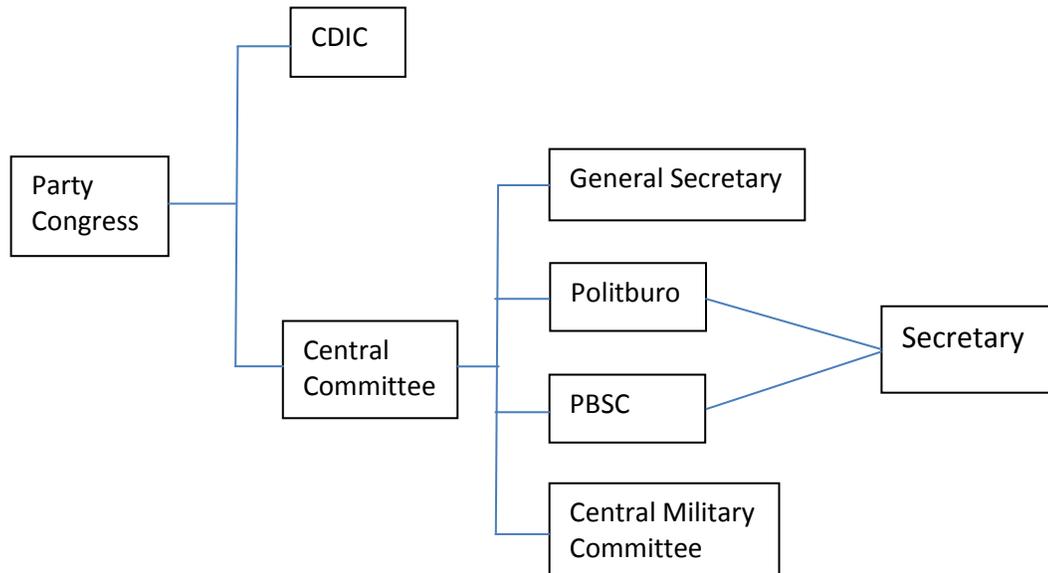
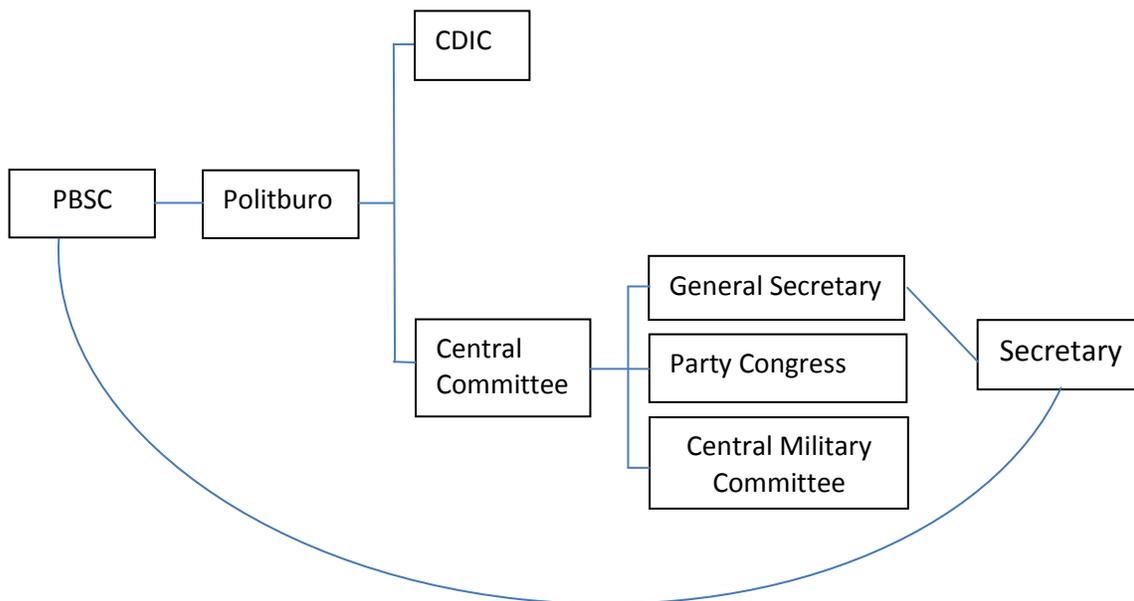


Figure 6. Party Hierarchy in Practice



⁴ Source: translated from Xinhua News “中共中央” “zhonggong zhongyang” (The CCP Central Committee) (no date.) http://news.xinhuanet.com/ziliao/2004-07/14/content_1600008.htm (last accessed 3/24/2012)

The most significant observation that can be made from the two figures above is the different perceived bureaucratic levels of the Politburo Standing Committee (PBSC) in the Party hierarchy. Although the PBSC is supposed to rank below the NPC and the Central Committee, in reality, the PBSC is the highest decision-making body in Chinese politics. This ensures that power remains in the hands of the loyal few top leaders, instead of being diffused through the government system.

According to Gallagher (2011), some of the most visible results of this political structure include:

- Big pushes from the top in general directions for the lower levels of governments to follow up on
- A decision-making process that is opaque, even to the most well-informed scholars of the Zhongnanhai
- Clear need for extensive consensus-building from all levels of governance
- An effort to cultivate personal ties in order to increase one's personal resources, such as better information than what is publically available.
- Widespread corruption on all levels and in various magnitudes, in addition to problems with monitoring due to large breadth and depth of Chinese politics' invasion into all aspects of life and business.
- Substantial problems of discipline.

2.1.1 Politburo Standing Committee

As indicated in Figure 2 above, the PBSC in reality sits on top of the political structure and wields most of the political power in China (Martin, 2010). While the Politburo is considered the "command headquarter of the Party" (Lieberthal, 2004) where important political decisions are made, the PBSC is considered the "truly powerful inner circle" (Martin, 2010; Lieberthal, 2004), and the members are considered as the most powerful individuals in China. The PBSC meets infrequently and the discussions that go on behind closed doors remain private. By being responsible for the decisions made on behalf of the government and the CCP, the

outcome of the PBSC discussions is the promulgation of binding policies (Saich, 2011).

The size of the PBSC has changed over time (Lieberthal 2004). According to Wang (2003), the size of the PBSC has expanded, since the CCP Constitution does not specify a fixed number of seats. When the PBSC was first introduced at the 8th Party Congress, there were only five seats (Wang, 2003). Currently, there are nine members in the PBSC.

The expansion of the Standing Committee could be indicative of two things: the first being that the cabinet is aware of the increasing challenges that China will face in times to come, and is including more political elite to contain decision-making within the PBSC itself; the second being that political in-fighting has heightened to the extent that the addition of more seats is the only method of ensuring that political tussles are constrained so that the core still assumes an image of total control.

Motivation

The unified motivation of the PBSC members is to ensure that the Party remains in control of the country and to increase the People's Republic of China (PRC)'s status as a formidable international player worthy of respect (Li, 2009). Failure to retain control would lead to the eventual downfall of the Communist Party, and between now and then, political unrest in the country.

One method of ensuring that the Party remains in control is to ensure social stability. The PBSC's motivation to maintain social stability hence results in their having to make decisions on what to prioritize in their policies. Policies that only target economic growth will result in increasing social inequality and dissent, yet ignoring such policies may delay increasing the quality of life of most of the population. Thus, a need to balance policy outcomes is of crucial importance to the PBSC.

Resources

The PBSC's main resource comes from the fact that all of the PBSC members are well positioned in both the Party and state apparatus. As shown in table 3 below, many members of the PBSC hold dual positions in the state government and Party. By being high-levelled representatives of both organizations, this provides them with extreme authority, making their decisions virtually unchallengeable.

Table 3: Members of the PBSC, ranked in order of influence

Member	Position in the CCP	Position in the Government
Hu Jintao	General Secretary, Chairman of the CCP Military Commission	President of the PRC
Wu Bangguo	Party Secretary	Chairman of the NPC Standing Committee
Wen Jiabao	Party Secretary of the State Council	Premier of the State Council
Jia Qinglin	Party Secretary of the Chinese People's Political Consultative Conference	Chairman of the Chinese People's Political Consultative Conference
Li Changchun	Chairman of the Guidance Commission for Building Spiritual Civilization	-
Xi Jinping	Top-ranked Secretary of the Central Secretariat	Vice President of the PRC
Li Keqiang	Deputy Party Secretary of the State Council of PRC	First-ranked Vice Premier of the State Council
He Guoqiang	Secretary of the Central Commission for Discipline Inspection	-
Zhou Yonkang	Secretary of the Central Political and Legislative Committee	-

Source: "China"

(http://secondchina.com/Learning_Modules/GOV/content/GOV_standing_committee.html) and "Wikipedia Politburo Standing Committee of the Communist Party of China" (http://en.wikipedia.org/wiki/Politburo_Standing_Committee_of_the_Communist_Party_of_China) (last accessed 4/12/2012)

Strategies

The infrequent and unannounced schedule of the PBSC meetings, together with the air of secrecy that surrounds the decision-making process is a strategy to ensure that potential opponents will not have enough time to mobilize their own resources to combat the decision-making outcome. The unpredictability of the meetings is such that over time, threats to the policy produced are neutralized.

Essentially, the positioning of the PBSC on top of the hierarchical structure means that the body holds ultimate power over decision-making. In addition, the PBSC rules by consensus building between all the members. By providing a united front to the public, this eliminates rumors of factionalism and ideas of opposing the decisions made by the PBSC. It also ensures that PBSC members will cooperate with the outcome and do everything in their power and under their influence to ensure that the political will of the PBSC comes to fruition.

From the analysis above, it is clear that the PBSC wields significant power over renewable energy policy. Their combined decisions on how renewable energy should be promoted, while may not be clearly identified in policies, contributes significantly to the future trajectory of China's renewable energy industry.

Because of the extensive reach of the PBSC's influence on China's renewable energy sector over time, this thesis has identified three crucial factors to take into account when evaluating the influence of this major actor in Section 3.

The first factor is that the PBSC is set to change after the 18th Party Congress, held this autumn. Predicting what the lineup will be for the PBSC can induce better understanding on how much the renewable energy sector will be valued by the new PBSC.

Secondly, despite the united front of the PBSC, over time, political analysts have identified two factions within the PBSC: the "elitist coalition" and the "populist

coalition". The "elitist coalition" is led by Wu Bangguo and Jia Qinglin (Li, 2012) and includes the Shanghai Gang, entrepreneurs and the capitalists, and the "Princelings" (太子党) (Li, 2009b). The populist coalition is led by Hu Jintao and Wen Jiabao (Li, 2012), and includes the "*tuanpai*" (团派), rural leaders—especially those hailing from China's inland provinces (Li, 2009b).

The populist coalition, in line with Hu's ideology of a "harmonious society" (Li, 2009b), is a stronger advocate of a "green GDP" and the environment. In comparison, the elitist coalition is more focused on coastal development and rapid GDP growth. Although the renewable energy sector will certainly contribute to GDP growth, this thesis posits that coastal development will still champion the elitist coalition's list of policy priorities. As these coastal industries are mainly labor-intensive industries processing raw materials from overseas before being shipped out again for international trade (Yang, 1991), the renewable energy industry is not an important piece of the coastal industries pie. Hence, this thesis surmises that in comparison, the populist coalition is more likely to favor policies promoting the renewable energy sector.

The third and last factor is the change in the nature of leadership in China. As mentioned earlier, the era of "strongman politics" is over, and collective leadership, as defined by the working of the PBSC, is increasingly becoming the defining characteristic of today's Chinese elite politics (Li, 2012). Although Li (2008) suggests that this "one Party, two coalitions" PBSC will result in more balanced policies that aim to achieve both economic efficiency and social justice, the negotiations that go on behind the scenes will surely depend on the relative balance of power of the PBSC members.

As such, an analysis of the PBSC membership is important in understanding which faction will have more influence in the policy process.

Li (2012) state that the new factional dynamics in China have three dominant features. One is that the factions represent different socioeconomic and

geographical constituencies. As such, the different factions represent different interests— China’s entrepreneurs and coastal development by the elitist coalition, and the vulnerable social groups and regional development by the populist coalition (Li, 2009b).

In addition, the two factions have different skill sets and credentials that complement each other. The elite coalition is experienced in economic development, investment and foreign trade, while the populist coalition is adept in organization, propaganda, and rural administration.

Very minimal public information is available on the possible line-up of the Standing Committee, as the decisions are yet to have been made by the Party elders. As such, this thesis relies on predictions and analyses by political analysts outside the gates of Zhongnanhai.

The table on the following page shows several leading candidates that Li (2012) posits are strong candidates for the next PBSC.

Table 4: Factional Identities of the Leading Candidates for the Next Politburo Standing Committee

Elitist Coalition				Populist Coalition			
Name	Birth Year	Current Position	Factional Background	Name	Birth Year	Current Position	Factional Background
Xi Jinping	1953	Member of PSC, CMC Vice Chair, PRC Vice President	Princeling	Li Keqiang	1955	Member of PSC, Executive Vice Premier	Tuanpai
Wang Qishan	1948	Politburo Member, Vice Premier	Princeling	Li Yuanchao	1950	Politburo Member, CCP Organization Dept. Head	Tuanpai, (Princeling)
Zhang Dejiang	1946	Politburo Member, Vice Premier	Princeling	Liu Yuanshan	1947	Politburo Member, CCP Propaganda Dept. Head	Tuanpai
Yu Zhengsheng	1945	Politburo Member, Shanghai Party Chief	Princeling	Liu Yandong	1945	Politburo Member, State Councilor	Tuanpai, (Princeling)
Bo Xilai	1949	Politburo Member, Chongqing Party Chief	Princeling	Wang Yang	1955	Politburo Member, Guangdong Party Chief	Tuanpai
Zhang Gaoli	1946	Politburo Member, Tianjin Party Chief	Jiang Zemin's protégé	Ling Jihua	1956	Member of Secretariat, CCP General Office Head	Tuanpai
Meng Jianzhu	1947	State Councilor, Minister of Public Security	Shanghai Gang	Hu Chunhua	1963	Inner Mongolia Party Chief	Tuanpai

Notes: CCP = Chinese Communist Party; CMC = Central Military Commission; PRC = People's Republic of China; PSC = Politburo Standing Committee.

Source: Li, C. 2012. “The Battle for China’s Top Nine Leadership Posts” Washington Quarterly Vol 35(1) p. 131-145

Li (2008) suggests that the individuals listed above would have likely undergone the same trials as teenagers during the Cultural Revolution and the Tiananmen Square protests. As part of the “lost generation” in China’s history, many of them experienced loss of schooling opportunity, loss of relatives and close friends, public shaming and disgrace. Xi Jinping and Wang Qishan both spent years as farmers in Shaanxi Province, while Li Keqiang and Li Yuanchao worked as laborers in Anhui and Jiangsu provinces (Li, 2009a).

As such, both coalitions share the same fundamental motivations. Having experienced personally the effects of the Cultural Revolution and Tiananmen Square protests would have instilled in them the conviction to maintain political stability at all costs and to hide all political fissures from the public. Hence, they have learnt to cooperate with one another in order to achieve their shared goals.

On March 16 2012, Bo Xilai was purged by the Chinese government (Zhang Dejiang Replaces Bo, 2012; Moore, 2012). A Princeling and member of the elite coalition, he was stripped of all power on April 10, 2012; speculation that his chances for a seat on the PBSC have all but evaporated (Roberts, 2012b; Chovanec, 2012) now rings true (Roberts, 2012a; MacLeod, 2012).

This leaves one spot empty in the next PBSC. It is seemingly likely that another member of the elitist coalition will be appointed in order to maintain the balance between the two factions. Indeed, with many high-ranking Party members jockeying for the coveted position aside from the seven members identified by Li, the Standing Committee will be spoilt for choice. However, until the final outcome is decided, the balance of power within the PBSC is at stake, and with it, the fate of renewable energy policies.

2.1.2 Paramount Leader

The paramount leader is a term used unofficially to refer to the top political figure in China. The notion of a “paramount leader”, while important in the past to explain the promulgation of laws and regulation, has fallen somewhat out of use today.

Paramount leaders such as Mao Zedong and Deng Xiaoping asserted strong influence over the direction of the country’s progress before, during and after their time in office; of Mao, leading communist officials then said “we felt Mao could see farther than we could see and could understand more than we could understand. Therefore, when we did not understand Mao, we assumed that he was right and we were wrong” (Lieberthal, 2004).

Similarly, on ideology, it is true that their terms (“Mao Zedong Theory” and “Deng Xiaoping Thought” respectively), which represents the leaders’ political ideas and gravitas, are still revered and hold much weight today (Breslin, 2008). Ultimately, ideology was an important tool to ensure that lower-level officers would comply with the Party’s wishes (Lieberthal, 2004).

However, political scientists would contend that recent paramount leaders such as Jiang Zemin and Zhu Rongji, and addition to the incumbent paramount leader, Hu Jintao, have not and do not enjoy such an influential platform (Breslin, 2008).

For example, it has been widely agreed that Hu Jintao’s “Scientific Development Concept” (SDC) has fallen short in comparison to previous guiding theories. In Qian’s opinion (Qian, 2011), Hu is aware of the lack of orientation that his political legacy would contribute to the upcoming 18th Party Congress. Indeed, as the gap between the rich and the poor continues to widen, the media often paints the “harmonious society” goal of Hu’s political ideology as a failure (Satisfy the People, 2012). Qian (2011) also found that after the 17th Party Congress, there was also a noticeable decline in reference to the SDC in the official People’s Daily. In comparison to SDC, the previous doctrines have been consistently quoted in the media and official documents.

In fact, many do not consider Hu Jintao a paramount figure, and instead maintain that the core power is shared between Hu Jintao and his Premier, Wen Jiabao, even coining the term “Hu-Wen leadership”⁵.

As mentioned earlier, power has been increasingly vested in the division of authority—a concept Ken Lieberthal (1994) calls “fragmented authoritarianism”. This term suggests that while China is an authoritarian state with institutional powers, this landscape of power has evolved significantly and today takes the shape of several agents and agencies wielding power. Nagel agrees, adding that the “age of the strongman” in Chinese politics is over. He suggests that a more collective style of leadership will dominate the political scene (Nagel, 2000).

Many China watchers posit that along with “fragmented authoritarianism”, the President-Premier relationship will be continued with heir-apparents Xi and Li. If so, there will be political implications for the renewable energy industry.

As mentioned in the previous section, Xi is a member of the elite coalition, while Li comes from the populist coalition. Their divergent views on subjects and direction for the country’s future development will require much consensus. Li (2008) predicts that the pairing of members from rival factions could induce less policy promulgation in the future, with emphasis placed on policies that consider both economic efficiency and social justice (Li, 2008a). One subject that they might be able to find more common ground on is the renewable energy sector.

This renewable energy sector meets many of the two future leaders’ goals—economic expansion that also results in increasing “green GDP”, supporting entrepreneurial private renewable energy enterprises while ensuring an expansion of employment opportunities in the higher paying high-tech industry.

Although this general assumption suggests that the renewable energy industry can expect the top-most leaders to throw their weight behind policies favoring the

⁵ See Shaun Breslin (2008) “Do Leaders Matter? Chinese Politics, Leadership Transition and the 17th Party Congress”. *Contemporary Politics* Vol. 14 (2) p.215-281.

industry's development, changes in the political environment, both domestic and internationally, may affect the Xi-Li relationship.

2.2 Government Structure

2.2.1 Central Government

According to Lieberthal and Oksenberg (1988), the central government, or the "Center" by the Chinese, is made up of four tiers. The first tier is the core group of top leaders that articulate national policy. The second tier consists of staff, leading groups, research centers and institutes to link the political elite to the bureaucracy. The third layer comprises of the State Council commissions and ministries; in the fourth and last tier are the local ministries that implement policy.

This thesis looks at three actors in the second and third layer. The local ministries in the fourth tier will be touched upon in the next sub-section.

2.2.1.1 Leading Small Groups

Leading small groups (LSG) are informal bodies of members in the state council that generate information to advise the state council on policy, and later aid in coordinating the implementation of policy decisions made by the top leaders with the relevant bureaucracies. Its strategic position between the commissions and the ministries, as shown in Figure 2 above, confer it power over the bureaucracies under its auspice.

Not only is the process within each small group opaque, Miller contends that the membership of each group itself is often kept secret because of the sensitivity of the political processes that each LSG have to deal with (Miller, 2008). Lieberthal posits

that a LSG typically comprises of a PBSC member and other Party members (Lieberthal, 2004).

Historically the LSGs were created for three reasons: to support in turning the paramount leaders' ideology into reality, to provide younger leaders with the necessary experience for managing the Party, and to provide an excellent ground to evaluate the abilities and skills of heir-apparents⁶.

The State Energy LSG was formed in 2005, with Premier Wen Jiabao at the helm (*China Sets Up National Energy Leading Group*, 2005; *State Energy Leading Group Office*, 2005) to improve energy policy coordination and to enable the center to improve its control over energy policy (Lewis, 2011). Referred to in the media as the "National Energy Leading Group" (NELG) (*State*, 2005; *China*, 2005), many critics surmise that the NELG was formed because of an absence of central organization in charge of energy policy in China (Kong, 2006). The position of the second highest member in the Party hierarchy lent the NELG weight in terms of acknowledging how critical the energy scenario is, and also enabled its policy proposals to be accepted by the NPC more quickly and smoothly.

The level of resources that LSGs have is low, and varied. Manpower is often limited to the number of Party members in the LSG (often under 30) and they must rely on the Central Party Secretariat or the State Council Office for support and additional manpower to move bureaucracies or state enterprises in the desired direction. In addition, their level of influence depends individual member's ranking in the bureaucracy (Lewis, 2011).

A news report on the founding of the NELG commented that the NELG members agreed to make a mid- and long term national plan for energy development, with emphasis added to new types of energy, including wind and solar energy (*China*, 2005). This endeavor later culminated in the development of the Medium to Long-

⁶ An excellent history and list of suggested possible LSG can be found in "The CCP Central Committee's Leading Small Groups" by one of the world's leading authorities of China policy, Alice Miller, Published in the China Leadership Monitor.

Term Development Plan for Renewable Energy in 2007. This points to the ability of LSGs to strongly shape policy.

Downs (2008b) comments that despite the high bureaucratic level of the Party members in the Energy LSG, the Energy LSG was still incapable of solving China's energy governance problems, as they are mainly rooted in the structure and power distribution within the energy bureaucracy. This bureaucratic structure and power distribution will be further analyzed below.

In 2008, China's energy policymaking was restructured, resulting in the integration of the Energy LSG into the National Energy Commission (NEC) under the NDRC in March of the same year (Downs, 2008a; Cabestan, 2009). Hence, although the energy LSG has contributed greatly to renewable energy policy promulgation in the past, is no longer a major actor for analysis.

2.2.1.2 Ministries

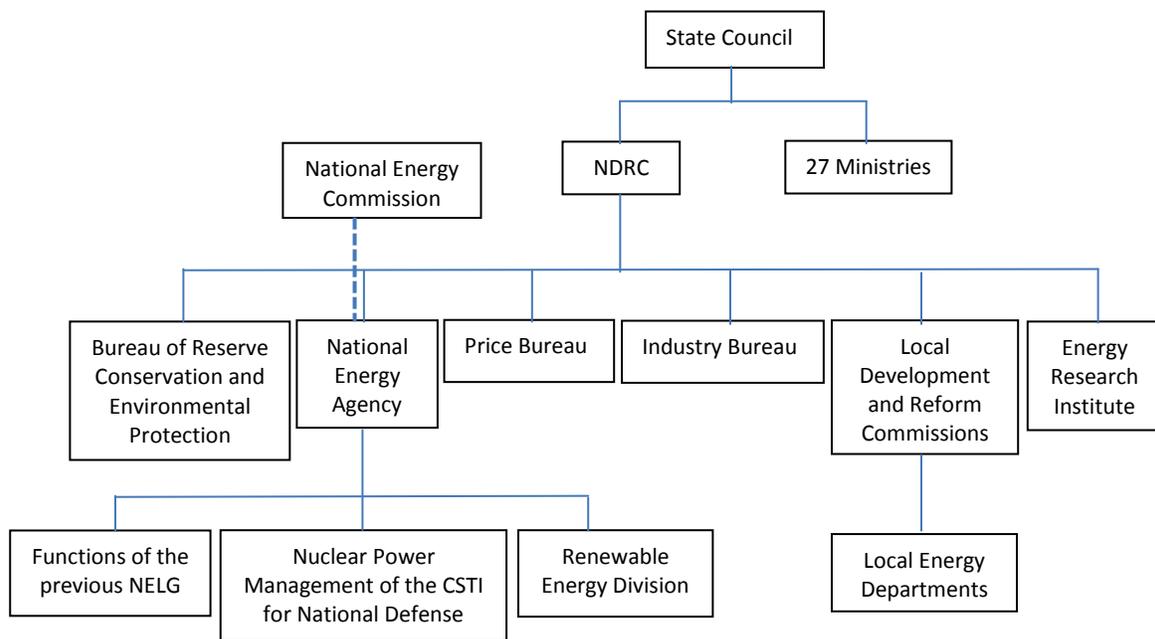
The ministerial arm of China's government comprises of many special agencies and commissions, each focusing on a specific sector. In the energy sector, the current institution with the most authority over China's energy sector is the NDRC

The NDRC is formally known as the State Planning and State Development Planning Commission. As suggested by its title, its current duties are diverse, spanning from economic and social restructuring, to coordination of various socioeconomic policies and ensuring fiscal stability.

In addition to NDRC, NEA and NEC are important agencies within the ministry that are important to understanding the energy policy process. NEC is a high-level "advisory and coordination body" that took over the NELG and is responsible for developing the national energy strategy (Hong, 2010). NEA, which took over the now-defunct National Energy Bureau (NEB), is the administrative entity for NEC and handles NEC's daily affairs (Downs, 2008a; Hong, 2010; Zhang & Lee, 2008). As can

be seen in the diagram below, NEC is a separate entity from the NDRC and other ministries, but institutional overlap still occurs because its administrative arm, NEA, is a department under NDRC.

Figure 77 : China’s Current Policy-making Bodies



As shown in Figure 3, the ministries fall under the State Council. However, according to Martin (2010), despite their subordination to the State council and the other various levels of government agencies, the ministries “wield decisive tactical

⁷ Adapted from “China’s Thirst for Oil”. 2008. *Crisis Group Asia Report No 153* http://www.crisisgroup.org/~media/Files/asia/north-east-asia/153_china_s_thirst_for_oil.ashx (last accessed 4/13/2012)

influence over policy by virtue of their role in interpreting, implementing, and overseeing what central leaders often broadly and somewhat ambiguously define as Chinese policy goal”. Hence, their motivations, resources and strategies as major actors deserve close analysis.

Motivations

The main motivation of the officials in the ministries and commissions is to ensure that the organization remains relevant in the organizational hierarchical structure. This is especially important against a backdrop of constant organizational reform in China. Maintaining organizational turf is important to ensure that the agencies are not dissolved or integrated during the next round of reforms. In order to do so, they must ensure that their mandates are successfully carried out and implemented, and that their turf is defended against encroachment from other ministries.

A personal motivation for ministry officials to ensure that their agency performs well under their charge is a significant one. Although much of the political ascension of any Party member depends heavily on patron-client ties and *guanxi*, leadership capabilities are highly favored as well. Lewis (2011) describes *guanxi* as “a bond that insinuate mutual obligation and is derived from family connections, common geographical origin, or shared experience”. Ensuring the success of one’s organization proves leadership skills and one’s ability to use networked relationship to one’s advantage. Indeed, political enemies were often placed in leadership positions in areas doomed to failure only to make them the scapegoat.

Resources

In a country where secrecy and information is highly valued, possession and control over complete data is a powerful resource. Ministries are tasked with collecting and processing data for the entire country. Leaders depend on information generated by ministries in order to assess policies before passing them (Lieberthal, 2004).

Although these institutions are supposed to remain impartial, neutral organizations, ministries are, in fact, in a position where they can influence policy decisions by

deciding what kind of information to publish and when. Lieberthal (2004) indicates that information was shared strictly on a need-to-know basis. This resource thus can be used strategically in exchange for other resources or as a bargaining chip to ensure that the ministries directives were carried out.

The Ministries often lack the necessary resource for them to succeed. Zhang & Lee (2008) highlight the lack of resources, including political authority, technical resources, manpower and adequate budgets provided to the NEB when it was established. Tasked with regulating the development of the country's energy sector (Kong, 2006), the NEB was only given an initial staff of 30. The lack of authority of the NEB to cover its job scope was telling: after widespread energy shortages, and only two years after the NEB was developed, the NELG and the State Energy Office were created in 2005 to step in and improve the energy situation.

Downs (2008b) suggests this lack of resources to be consistent for all energy institutions, and comments that this is a trend that NEA (and NEC) is unlikely to break. Indeed, NEA was staffed with 112 (Downs, 2008b; Zhang & Lee, 2008), at least half of which had been suggested will be given to high-level positions, resulting in insufficient manpower at the lower levels to carry out the actual leg work (Downs, 2008b). Regardless, although a 112-strong staff is a significant improvement over the NEB, is still much smaller in comparison to the U.S. Department of Energy, which has about 4,000 employees (Downs, 2008b).

Fragmentation of control, a result of over two decades of bureaucratic restructuring, is a serious resource shortage. Together with a lack of political autonomy, it has often been cited as the main hindrance towards the development of a national energy strategy (Crisis Group Asia, 2008). The dissolution of the Ministry of Energy in 1993 was a result of overlapping responsibilities—for example, the Ministry of Water Resources is in charge of hydropower development, the Ministry of Finance is in charge of developing financial instruments to promote renewable energy development, Ministry of Land and Resources for reviewing and granting licenses for mineral and petroleum exploration, etc. (Bo, 2006). Turf battles within the

energy sector have been noted to be common (Downs, 2008a; 2008b). Each ministry strives to maintain control over its turf, and strongly resists newcomers to prevent additional competition.

Not only is power over energy policy thus shared, the Ministries themselves possess the same bureaucratic rank, thus making it impossible for one ministry to supersede others. This means that all ministries have to be on the same page for consensus on issues, so that the issue can be pushed through. If not, the various ministries can take turns to block one another on a policy, leading to stasis. This is consistent with Lieberthal (1988) suggestion that interagency relations are fraught with constant negotiations, bargaining and deal cutting. Downs (2008b) posits that NEA lacks the authority to resolve disputes among more powerful actors, including the other ministries. For example, passing a law on promoting solar energy farms would not only require approval from the NDRC, but also the Ministry of Land and Resources, and the Ministry of Finance. Should one ministry object, negotiations would arise, leading to administrative costs such as time lags and severe inefficiency.

Because NEA only holds a vice-ministerial position, it possesses low level of authority. In comparison, while many SOEs do not hold ministerial rank, they are influential enough to undermine a ministry's authority. For example, Downs cites a complaint by a former NEB official that energy SOEs often hold closed door face-to-face discussions with senior PRC leadership, thus effectively undercutting NEB's authority. Downs (2008b) further adds that although NEA has more political clout than the then-NEB, it is still insufficient for overcoming the bureaucratic infighting the often prevents progressive energy decision-making from forming, or from ensuring that the interest of ministries, commission and energy SOEs can be successfully coordinated.

Lewis (2011) agrees that the ministries are devoid of true power over most of the policy making process. He argues that the formation of NEC is a mechanism simply to allow the members of senior rank with energy background, and especially

members of the Politburo, to maintain informal control over energy companies and energy policy formation.

In addition to the bureaucratic ranking of the institution, the Party rankings of the agency leaders also matter. The Party ranking system in China is not clear-cut, but is assumed to take into consideration a member's past and current positions, strength of *guanxi* relations, and seniority.

Qu (2010) indicated that within the NEC are 21 minister-level members from the State Council, CCP, national security authority and the PLA, which is considered an unusual practice as it is more diverse than in other ministries. The varied background of the NEC leadership is a valuable resource and strategy as it provides the NEC with a vast network of relationships through the various high-leveled bureaucratic organizations at its disposal. This can enable it to garner support in times of critical need, and by connecting directly with high-ranking executives in the other agencies, it can reduce administrative cost of going through the normal channels for policy approval.

Inter- and intra-agency relations are dominated by *guanxi*. Lieberthal (1988) suggested that "no units or individuals let you have something strictly according to regulations. Rather, you must have *guanxi* or you come up with nothing". NEA certainly can benefit from the personal resources and leadership of one man. Liu Tienan, who took over the helm of NEA in 2007, has a varied but substantial background in energy and cross-industry coordination and finance. His background of cross-industry coordination will certainly come in helpful when managing the conflicting views and objectives of the different energy organs. His time spent previously at these agencies that NEA has frequent interaction with will also enable NEA to utilize the relationships that Liu Tienan has cultivated with important leaders in the agencies. Coming from his previous post in the NDRC as vice chairman, Liu is said to have earned a positive reputation from his peers and elders in NDRC, which will certainly come in helpful when seeking support from NDRC (Chen & Zhang, 2011).

Strategies

Although the NEA is perceived to have low levels of influence over policy matter, because it provides administrative assistance to NEC and share common objectives, one strategy that NEA can implement in order to alleviate its status is to seek NEC's approval and weight to its policy proposals.

NEA has also recently benefitted from two new sources of administrative control that it can use as leverage against the powerful SOEs. Firstly, it has gained administrative control over China's strategic domestic oil reserves and oil refining industry. Although it is not uncommon for SOEs to ignore instructions from other ministries, the oil reserves and refineries are an important profit-making area for energy SOEs. Failure to comply with future instructions from NEA may result in costly delays and administrative troubles for SOEs.

More importantly, NEA has been allowed to contribute to the decision-making process for price adjustments to energy products such as electricity and petroleum (Downs, 2008b; Zhang & Lee, 2008), as such, adding weight and influence on the energy sector as a whole. This decision-making process is important to the renewable energy policy as it will impact policies on pricing and output agreements and may affect future policy-making decisions. Downs (2008a) is less optimistic about NEA's ability to contribute significantly to energy pricing, as she speculates that the NDRC and the State Council will still hold final control over energy prices. Regardless of the ultimate level of influence that NEA will have over energy pricing, NEA has been given an opportunity to sit at the decision-making table, and by being one of the decision-makers, it can either facilitate or hinder future energy price policies.

A strategic move on part of the central government was to place Wen Jiabao as the head of the former NELG, and have Li Keqiang spearhead the development of the NEC, and then stay on as the deputy director of the NEC. With Li Keqiang as the heir-apparent to Wen Jiabao, having a direct relationship with the future Premier will be a valuable strategy that NEC will be sure to employ.

2.2.1.3 Government Sponsored Think Tanks

Government sponsored think tanks (GSTT) are think tanks sponsored by a state entity (Martin, 2010). Historically, Chinese leaders have considered think tanks a fitting method to increase rationality and democracy in the decision-making process (Zhu & Xue, 2007). Since the reforms, the Party and government's awareness of the ability for think tanks to contribute to solving socio-economic policies has increased (Yang, 2011).

In contrast to the other government offices, GSTT are unable to promulgate or mandate policies, neither are they capable of enforcing policy implementation. In that sense, they are only able to influence the policy process during the initial portions, after which they are removed from the process.

The primary objective of GSTT is to provide policy-makers with access to information and to advise them throughout the policy process. According to Zhu (2011), Chinese think tanks provide three services: as advisors to the government, academia in research, and advocates to the public via their openness. As such, they can be extremely influential.

Recently, NEA, together with NDRC, announced the establishment of the China National Renewable Energy Center (CNREC). The CNREC will focus on renewable energy programs and policies, as well as support drafting industry standards and carrying out international cooperation programs (Du, 2012). The GSTT has already procured technological and financial support from Denmark, and further aims to partner with the National Renewable Energy Laboratory in US and with Spanish energy agencies (Patton, 2012).

This portion will focus the analysis on CNREC as a major actor.

Motivation

Think-tanks are motivated to produce quality information in the policy process. Yang (2011) agrees that think tanks affiliated to ministries tend to be “more focused in their research because of their direct involvement in policy research and development”. Additionally, CNREC’s desire to coordinate with international government research agencies in the future will depend on its ability to prove that it is a world-class research institution

Contributing positively to the renewable energy industry via its influence on the policy process will help cement the CNREC’s ability to lead the industry and increase its accountability to the Party and state. In a country where information is given on a “need-to-know” basis, should the CNREC live up to expectations, it will be able to gain the trust and respect of the higher authorities. Over time, this might lead to CNREC becoming the de facto source for providing analysis and recommendations for future renewable energy policies.

Resources

The CNREC boasts of a variety of influential leaders from different industries and governmental backgrounds: Wang Zhongying, deputy head of the Energy Research Institute under NDRC; He Dexin, president of the China Wind Energy Association; Li Junfeng, president of the China Renewable Energy Industries Association; and Shi Denghuan, member of China’s State Council (Patton, 2012). Housing all these energy experts in the same think tank will be essentially akin to cultivating bacteria in a nutrient broth— it provides them an avenue for intellectual discussions on the energy scenario and for possible solutions. With some cooperation, these leaders may be able to develop renewable energy solutions that will provide a win-win solution for both the country and the industry.

The Chinese think tank field is more transparent and open than its government counterparts (Martin, 2010). Researchers and scholars are widely accessible to the public. For example, CNREC’s deputy director maintained that the center is open to

universities, companies and local bureaucracies seeking information for renewable energy programs (Du, 2012). Their ability to attend international conferences, publish papers and journal articles, and interact freely with international scientists (Martin, 2010) informs them about novel scientific discoveries, which will give them an edge over other policy researchers.

As mentioned above, because of its status as a think tank, CNREC enjoys autonomy in performing research and consultation. Indeed, Zhu and Xue (2007) identify autonomy as a distinction between GSTT and ministerial research departments. The ministerial research departments are unable to determine the research question and when to conduct research, because of the overreaching authority of the state. Instead, they are reliant on orders from above on what to research, and when.

However, CNREC is still dependent on the state for resources such as human resources and funding. Yang suggests that contrary to Zhu and Xue's (2007) observations above, in comparison to think tanks in the U.S., GSTT still suffer from dependency on the political regime because of their attachment to the state government and Party.

Strategy

Conversely, there are benefits to being affiliated to the government and Party. GSTTs often find themselves in the favorable position of being able to enjoy closer ties to the government and Party. CNREC should exploit this advantage to research on and promote more progressive policies to government officials. Indeed, industry reporters said that CNREC's "close relationship with NEA means that any work done by the center will be taken into account by the chief policymakers" (Patton, 2012).

Martin (2010) states that GSTT have been "on occasion" tasked with drafting the actual legal documents before they are reviewed by government leaders. This puts GSTT on par with ministries in their ability to influence the policy process to a great extent. According to Zhu and Xue (2007), China's think tanks are increasingly

influential. If this is true, then we can certainly expect CNREC to play a dominant role in the decision-making process in near future.

Lastly, CNREC should take advantage of being established by NEA together with support from NDRC, as well as being located in the same building as the Energy Research Institute (Du, 2012; Patton, 2012) to build informal coalitions with the three state energy agencies. The close physical proximity of the CNREC to ERI will provide CNREC with multiple opportunities for employees to network with one another and engage in information sharing. The combined efforts of NEA and NDRC to set up the CNREC may have resulted in *guanxi* having been developed along the founding process, especially if the CNREC executives had been appointed by the two agencies. CNREC should leverage on these formal relationship networks to support it in instances of recommending politically unpopular or controversial renewable energy policy changes.

2.2.2 Local Government

The local political system, whose hierarchal system is a replica of the central government hierarchical system with a parallel Party administration and a governmental body, constitutes the second part of the Chinese government system. The local governments are important government structures, with many of them governing over provinces the size of European countries.

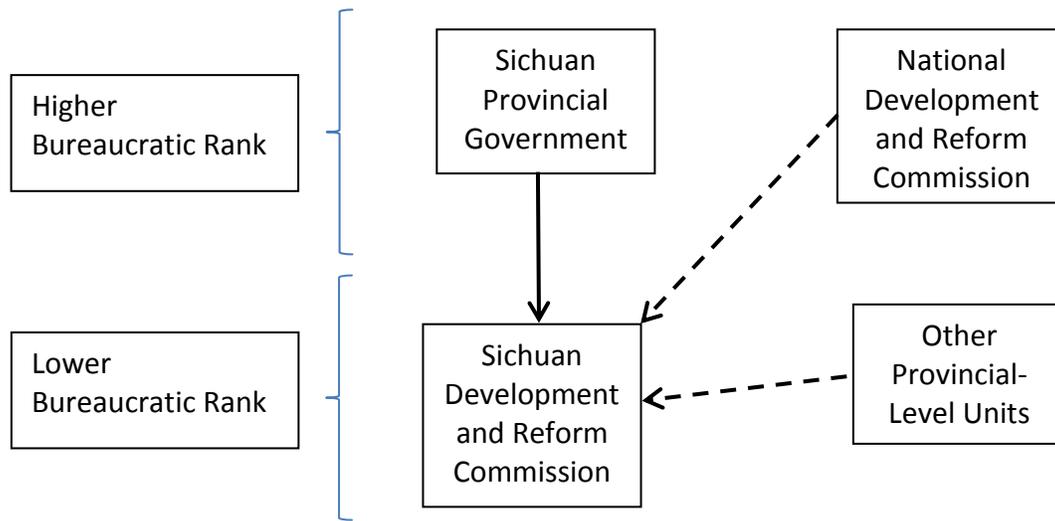
As part of the widespread decentralization efforts, local governments are given a much larger role in decision-making (Lieberthal, 2004), and also in carrying out policy implementation. The notion of local knowledge and that local governments are in a better position to make decisions directly affecting themselves certainly contributed much to the decentralization efforts. Martin (2010) attributes the strong role of the local government also to lack of personnel at higher levels to implement policy themselves.

In addition to decentralization, the structural hierarchy of the central government and local government results in interesting interplay, complicating renewable energy policymaking. Lieberthal (2004) calls this concept “fragmented authoritarianism”; where vertical coordination (from the center to locality) and horizontal coordination (within a given geographical area) interfere with one another, resulting in a political administrative hierarchy that makes it “relatively easy for one actor to frustrate the adoption of successful implementation of important policies” (Lieberthal, 2004).

The flow chart below, adapted from Gallagher (2011), indicates the bureaucratic ranking and relationships of the various institutions. The solid arrow shows the direction of influence and flow of resources from one institution to another, while the dotted arrows show the direction of limited influence and resources.

As shown below, the equal graphical standing of the Sichuan Provincial Government and the NDRC indicate that provincial governments and the ministries share the same higher bureaucratic rank than the local bureau. The solid arrow pointing from the Sichuan Provincial Government to the Sichuan Development and Reform Commission indicate that the provincial government has a greater level of influence over the local bureaus, while the dotted arrows indicate a weaker source of influence from the NDRC and the other provincial units.

Figure 8: Decentralized Leadership Relations⁸



As a result, Chou (2009) suggest that although local governments are supposed to be subservient to policies passed down from the ministries as mandated by central authorities, numerous literature and cases have proven that infractions are common.

Motivations

During 1980s, Deng Xiaoping initiated the “Socialism with Chinese Characteristics”, which essentially sought to gain economic reform and to open the Chinese market to the world (Chou, 2009). As part of the market reform, China’s economy structure transited from being centrally planned to a more market-oriented economy. The decentralization/ deconcentration is often focused on the performance indicators of local governments as a method of increasing efficiency and holding local governments and managers accountable for their performance (Chou, 2009).

⁸ Adapted from Gallagher, M. 2011. “Communist Party Rule, Bureaucracy and Policy Implementation. Political Science 339, Lecture 14. Slide 18. Winter 2011. The University of Michigan [Transcript]

As part of the decentralization plan, a cadre evaluation system was drawn up, to ensure that local officials worked to develop the local industry. Chou (2009) documented that the local leaders were evaluation under a system that was divided into 4 compartments with points adding up to 100, as shown below. Although specific indicators vary across the country, the emphasis on economic development, and the positive impact on renewables development, is apparent. Li et al. (2011) published results of research on Dezhou city in Shandong indicating that the local government promoted the renewable energy industry after realizing the potential it had in job creation and revitalizing the local economy.

Table 5. Evaluation Criteria for Local Leaders.

Indicator	Mark
Economic construction	60
Party building	20
Social development	20

Source: Chou, K.P. 2009. "Government and Policy-making Reform in China" Routledge.

One part of the cadre evaluation system saw township leaders unable to meet the targets being slapped with penalties. Chou (2009) observed that penalties ranged from 3,000 to 5,000 Yuan for township leaders. One strong motivation of the leaders was thus to ensure that the economy was developing healthily, so as to avoid paying a hefty penalty.

Although the cadre evaluation system strongly ran tangent to most renewable energy policy goals, one of the local leader's strongest motivations is for Party promotion and cultivating patron ties. Despite equal authority to ministries in bureaucratic ranking, when it comes to progression up the CCP, members are expected to be compliant to the wishes of the central Party. Frequent disobedience to policy mandates will result in a negative portrayal of the leader as a Party

member. This will result in some motivation for Party leaders to accept and implement forward-looking renewable energy policy.

The performance of local leaders is a serious matter for nomenklatura purposes. Lieberthal (2004) and Saich (2011) both cite that the organization departments from the Party territorial level to the national level keep extensive personnel files of each member for review when posts become available. The organization department use the information to makes key recommendations, for the Party committee to make the final decision.

Resources

The influence of local governments over the policy process predominantly arises from the fact that local governments are the key source of resource flow to local bureaus. Consistent with nomenklatura system in the CCP and as indicated by the solid arrow in Figure 8 above, local officials hold the power to decide on resource distribution, promotion and employment within the provincial government. As such, to ensure continuous flow of support from the local officials, there is greater propensity for the local bureau to obey orders coming from the provincial government and ignore conflicting orders from the ministry.

Often, governments are often held accountable for their actions by media coverage and political transparency, which can make or break a Party member's political career. Local officials in China often enjoy much privacy in handling policy matters because of the relatively closed political system and tight control on mass media. As a result, lax supervision enjoyed by local leaders enables them to wield their authority more extensively and intensively than in other forms of governments.

Li et al. (2011) and Han et al. (2010) both conducted studies on the SWH industry, and identified the ability for local governments to provide locale-specific preferential policies to support the renewable energy policy. This ability to provide simple, yet crucial local policies can enable renewable energy companies to break

into well-established energy and appliance markets, thus giving them an opportunity to expand their market share.

Guanxi with high-ranking officials is a very important resource for local officials. In the entire bureaucratic picture, local officials are almost at the complete bottom of the hierarchy. Because of the fragmented nature of policy-making, national policies need to be approved by the NPC before it can be passed. As such, policy-making in China relies heavily on coordinated support from several parties and also high-level officials willing to champion the issue in order for the policy to move higher up the bureaucratic ladder (Saich, 2011). Hence, save for local policies of little influence, unless local officials have strong relationships with high ranking officials, they will most likely have little ability to develop high-leveled renewable energy policies.

Strategies

Disjointed and conflicting and sometimes missing information is a common excuse for local governments uninterested in implementing centrally-mandated policy (Chou, 2009). China is a large country with an administrative hierarchy that is complex and fractured. With so much control over information, often whatever information is made available is often fragmented or outdated. Together with possible conflicting directives coming from various channels, local governments are simply incapacitated to implement policy. The asymmetrical flow of information and directives on how to use the information often provide local governments with excuses to prevent policies running counter to their personal interests from being implemented.

Despite the “decisive tactical influence” that the ministries wield over renewable energy policy, ministries in reality have little direct control over local implementation of national laws and regulations (Martin, 2010). Hence, the task of policy implementation falls on the local government, thus allowing for a large degree of local autonomy. Lewis (2011) surmises that without local government support, policymakers face having policy being ignored and having roadblocks

presented during the implementation phase. Such is the powerful influence of the local officials.

Another strategy that local governments use to negatively influence the policy implementation stage is to blame the vagueness of State Council directives. Although the state council holds primary authority over the energy systems, vague language is often used when referring to “other related departments under the State Council” executing tasks “within their responsibilities” (Crisis Group Asia, 2008). Furthermore, many articles task “all levels” or “various levels” of the government instead of citing specific bureaus or departments (Crisis Group Asia, 2009). This gives the local governments leeway to evade renewable energy policy implementation.

One example of central-local tension occurred after President Hu promoted reducing carbon emissions and improving environmental preservation in his report to the Party Congress in October 2007 (Crisis Group Asia, 2008). Many local governments chose to ignore these directives because their performance as provincial government officials, together with their promotion, is measured by economic growth, which would have been negatively impacted by the directives, despite many positive externalities.

2.3 Enterprises

2.3.1 Central State-Owned Enterprises

In China, the energy sector is dominated by SOEs (Lewis, 2011). Historically, SOEs were created after a wave of decentralization as a bid to improve economic efficiency and technological dynamism, while ensuring that control over crucial industries remained in the hands of the national leaders.

SOEs are, as the name suggests, legal entities of the government. Although the Chinese government’s definition of a SOE is “in which all assets are owned by the

state” (Szamosszegi & Kyle 2011), it has been widely understood that there are in fact three types of SOEs, each with varying levels of autonomy from the central government. The first category includes enterprises that are fully owned by the state via a bureau under the State Council called the State-owned Assets and Supervision and Administration Commission (SASAC) and the local equivalents. The second category includes non-SOE enterprises that are effectively controlled by their SOE owners, and the third category includes entities owned and controlled indirectly through SOE subsidiaries (Szamosszegi & Kyle, 2011).

According to economic historians, SOEs are “heavily path dependent” (Lin & Milhaupt, 2011) and favor the status quo. Their monopoly over the energy sector also often enables them to make their own decisions on their own terms. Hence, renewable energy SOEs do not seem to have much motivation to prevent change.

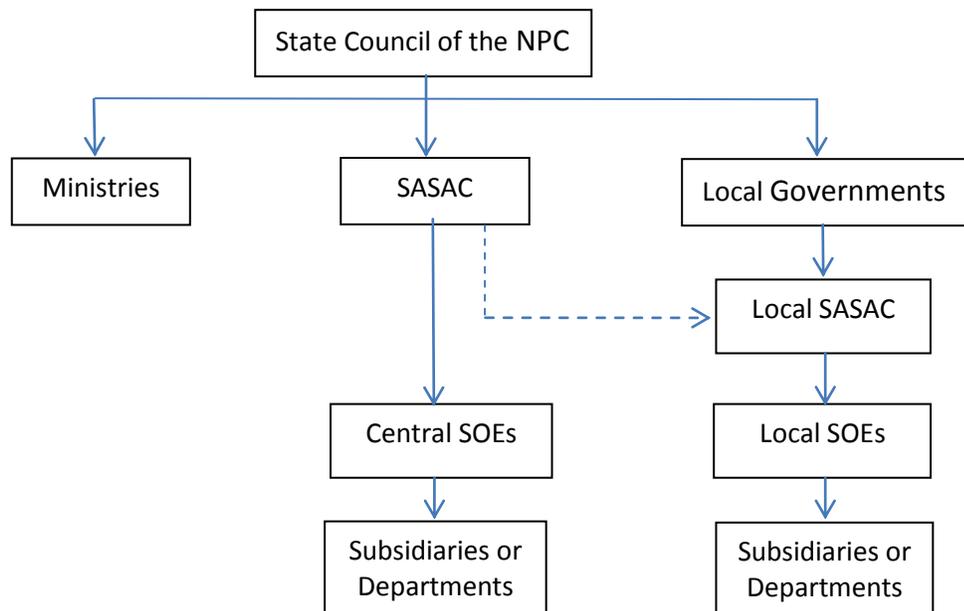
In this thesis, the SOEs analyzed are renewable energy SOEs that fall into the first category. In particular, central SOEs, such as those in the hydropower industry, will dominate the discussion. Central SOEs tend to be large enterprises, and hold a monopoly over the market, or are part of an oligopoly. Local SOEs, such as those in the wind power industry, are often smaller enterprises in terms of size, capital, and manpower, and often are characterized by perfect competition market.

According to Lin and Milhaupt (2011), there are four main parts to a SOE: the core company, the listed company, the finance company and the research institute. The core company serves as an intermediary between the SASAC and the firm that engages in the actual production. During the decentralization phase, many of the government ministries were “corporatized” into the core company. The listed company acts as the external face whose shares are publically traded on stock exchanges. SOEs benefit from possessing the finance company as it enables them to be exempt from general prohibitions on inter-company lending, in addition to authority to engage in a wider range of activities than private enterprises, albeit subject to approval by banking regulators. The research institute was promoted by

Chinese policymakers to ensure that each SOE did not overlook the central government's desire for increased technological development and competitiveness.

The graph below shows the relationships between the central and local SOEs, SASACs and the government.

Figure 9: Structure of Relationships among SOEs, SASACs and the Central and Local Governments⁹



From the schematic diagram above, we can see that the central SOEs come under the purview of the SASAC, and hence have a lower bureaucratic level than the ministries.

⁹ Figure from Deng, Y., Morck, R., Jing, W. & Young, B. (2011) "Monetary and Fiscal Stimuli, Ownership Structure, and China's Housing Market". *NBER Working Paper Series*. no. Working Paper 16871. Cambridge, MA: National Bureau of Economic Research.

Motivations

SOE leaders are highly motivated to ensure the enterprise's success for several reasons. Financially, Bodmer (2003) argues that wages are significantly sensitive to the performance of the company, and that this sensitivity also varied with the hierarchical position of the employee, incentivizing SOE leaders to move up the company by ensuring its productivity. Positive performance by the leader by ensuring that the SOE under his command flourishes economically is also rewarded by bonuses, a system that was recently reintroduced after being abolished during the Cultural Revolution period (Ralston et al, 2006).

Similar to leaders in the government energy institutions, SOE leaders are motivated by the Party's appointment system. Lin and Milhaupt (2011) cites an example where the SASAC nominated 22 members as representatives to the 11th NPC and 99 managers to the 11th National People's Political Consultative Conference—an advisory body. To be nominated to either governmental organ or Party group is not only a distinction of one's successes, but also one of the fastest way of promoting oneself politically.

As noted, personal connections, or *guanxi*, are important resources to develop and nurture over time. Lin and Milhaupt (2011) also identified that networks are formed by a variety of means, such as legal means and via personnel practices by the Communist Party and the SASAC. Legal means such as contract and shareholding relationships are enhanced when the performance of the enterprise improves, thus increasing the motivation to ensure continuous success of the enterprise itself and the renewable energy sector as a whole.

Although Lin and Milhaupt (2011) do not specify examples of personnel practices, we can safely assume that these include introduction of successful SOE leaders to one another to share their ideas and strategies. These personnel practices are valuable methods of developing strong relationships with other leaders in important Chinese governmental organs that the renewable energy SOE leaders would normally have little access to or methods of forming relationships with. Thus,

ensuring that the SOE performs well will enable the SOE leaders to be looked upon favorably and be considered for Party activities, where these important relationships can be formed.

Resources

The networks, as described above, also provide important flows of information. Industrial and market information in China is fragmented due to political fragmentation, the large size of the country, and also low capacity in the state research departments. There is a long time lag before data can be compiled and disseminated for use. These characteristics are not unique to China alone, but certainly aid in compounding problems. For example, national data for 2008 will only be made available in late 2012, even to researchers employed by the state (Personal Communications, 2012). Personal and company networks can circumvent these information lags by obtaining the necessary data or scientific information from the source itself, instead of waiting for the state to compile it.

Lin and Milhaupt (2011) suggest that the networks also allow for “relational exchange and collaboration on many levels of goods production and policy implementation process”. For manufacturing companies, these relational exchange and collaborations can result in win-win outcomes, allowing the companies to develop faster than their competitors.

Another valuable resource is their strategic links to other crucial bodies such as business groups, government organs and state-owned university research centers to further enhance their production chain. Named the “networked hierarchy” (Lin & Milhaupt, 2011), this network hierarchy is specific for SOEs due to the ability of the state as a controlling shareholder to provide these resources to the SOE. These links enable the SOE to tap onto vital resources of the other bodies, such as advanced technological information, business contacts, or international market information without itself incurring high costs to produce these resources themselves.

In addition to the benefits that SOEs enjoy from possessing financial corporations within its enterprise structure, they also enjoy additional favorable treatment from external state-owned banks (Szamosszegi & Kyle, 2011). As such, central SOEs are the only companies able to afford to make heavy capital investments for projects.

Traditionally, SOEs are important sources of employment (Lieberthal, 2004). Employment is in itself an important factor for social stability, and thus is an important goal for the central government. Because of its pillar in employment, and its ability to provide employment across a wide range of job-seekers, from illiterate laborers to highly-educated PhD graduates, the central government accords SOEs a significant amount of autonomy in its decision-making.

SOEs are also able to provide some influence over renewable energy policy because of their industry expertise, profitability, and key importance of helping to increase energy security and solve energy problems such as shortage and pollution in China. However, with the increase in central government capacity-building such as setting up Energy Research Institute, this influence is limited. Although Downs (2008a) suggests that these resources often allow China's energy firms to initiate major energy projects and policies, this is mainly true for the central energy providers such as the NOCs.

Despite the beneficial resources that SOEs enjoy, there are several deficiencies characteristic of SOEs. SOEs do not enjoy complete autonomy over their business strategies, due to strong state presence within the organization. This characteristic is consistent across all SOEs, regardless of the level of state affiliation. In times of critical need, decisions from the central government will supersede the firm's decision-making (Szamosszegi & Kyle, 2011). Their inability to remain independent from the government's activities suggests that regardless of however renewable energy SOEs may influence the renewable energy process, the SOE as an actor is significantly weaker than the other Party actors.

One example of SOEs' lack of autonomy from the government stems from the fact that the substantive management rights of many important SOEs are granted to a

ministry with supervisory authority over it. Lin and Milhaupt (2011) cite the case of China Mobile, whose supervising ministry, the Ministry of Information and Technology, holds important management rights, including the power to nominate its top managers. This two-way relationship between the central government and the SOEs reduces the level of influence that central SOEs will have on the policy process.

Strategies

One powerful strategy that SOEs employ to ensure continuous development of their organization is to wield their high bureaucratic rank when faced with roadblocks. Although central SOEs are theoretically ranked lower than ministries, in reality, they possess equal, or higher bureaucratic ranking than ministries (Lin & Milhaupt, 2011). The following example by Qiu and Li (2009) clearly shows the magnitude of power bureaucratic rank has over ministry-imposed policies.

In January 2005, a list on 30 major violations of the 2003 Environmental Impact Assessment Law by major national construction projects was published by the State Environmental Protection Agency (SEPA). Among them included construction projects sponsored by SOEs at the highest administrative level, amongst them, the China Three Gorges Project Co (CTGPC). The CTGPC continued to ignore SEPA's instruction to suspend its projects, and continued construction. A closer look at the problem suggests that the representatives of these companies are in the same or higher bureaucratic level than the administrators of SEPA. As a result, despite authority of SEPA to insist on these companies to adhere to its policies, the higher bureaucratic rank led to SEPA being unable to follow through with its policies (Qiu & Li, 2009).

Lin and Milhaupt (2011) identified a concept where SOE leaders are incorporated into the Chinese governmental organs as "institutional bridging". They raise a policy where 50 to 60 fairly senior managers in SOEs are seconded to the State-owned Assets Supervision and Administration Commission (SASAC) annually for one year periods, and vice versa. Although the primary motivation for the government to

establish this policy is to “build SASAC capacity and promote cooperation between the SOE sector and the government”, this is a win-win situation for SOEs as well, since the SASAC, situated directly below the State Council, is a special commission where laws pertaining to SOEs are drafted. A possible strategy thus for SOEs is to ensure that managers seconded to the SASAC build strong relationships with the permanent staff in the SASAC, in order to influence policies via *guanxi*, or use the one year secondment period to directly influence policies currently being drafted to positively impact their SOE or indirectly by impacting the industry that they are in. This would be the most powerful strategy for renewable energy SOEs, given that they do not have influential Party members to represent them.

2.3.2 Private Enterprises

The economic reforms in China led to two main themes: a progressive decline of state control on the economy, along with an increasing use of market forces to compensate for the lower levels of state planning (Saich, 2011), and a diversification of the ownership structure of the economy (Saich, 2011), as private companies, foreign-owned companies and MNCs started up.

Private companies have had an important role to play in China’s renewable energy industry. Although SOEs have a monopoly over the state grid and traditional energy resources, their lack of technological competence and poor levels of efficiency has prevented them from capturing the renewable energy market. Renewable energy companies, with little competition for the “new energy” industry, were able to flourish in the vacuum left by the economic reforms.

Today, many private renewable energy companies have done exceedingly well internationally. For example, Suntech, a solar PV manufacturing company, founded in 2001 by a Chinese scientist, has made sensational news worldwide. In a short span of four years since its inception, Suntech has been launched on the New York Stock Exchange (Knight, 2011), by 2006 Suntech had become the 4th largest

manufacturer of PV cells, and in March this year, Suntech Power Holdings Co., Ltd, the world's largest producer of solar panels, once again set a world record for the highest efficiency of a production cell using standard commercial-grade p-type silicon wafers (Snieckus, 2012; Aylott, 2012).

Given the high rate of success of China's renewable energy manufacturers and the current competitive nature of the renewable energy industry, the stakes are high in order for the renewable energy firms to out-compete their domestic and international rivals. Below, the methods that private entities use to influence policy are analyzed.

Motivations

The primary reason for influencing policy is clearly to ensure that their firm benefits from the influenced policy, relative to the status quo. The renewable energy industry is extremely competitive, with much of each company's edge over one another hinging on lowering costs and pushing the technological barrier made possible through their research and development departments. More favorable policies may include tax reductions or exemptions for their products, better access to funding sources, and greater access to external research institutions such as universities.

Resources

While most SOEs contain large portions of previous ministries and their officials in their core and hence by proxy possess significant *guanxi*, the private companies do not naturally contain any fraction of state bureaucracy in their company structure. Hence, in comparison, private companies are deficient in *guanxi* when they first start out (Kennedy, 2009). Although Kennedy (2009) suggests that enterprises are not dependent on *guanxi* as their main channel for influencing policy, *guanxi* is important for enterprises to open doors to future possibilities and partnerships. Maintaining *guanxi* also keeps the enterprises close to the thoughts of government officials who might be in a better position to influence policy. It is not uncommon for

company board members to pay frequent visits to officials, accompanied by gifts and also paid dinners. Hence, *guanxi* is still regarded an important resource for private enterprises.

Private enterprises serious about being a prominent long-term actor in the policy-making process, but do not have prior knowledge on the lobbying process or the necessary institutional capabilities have started investing in the services of public relations, consulting, and law enterprises to provide them with the resources necessary to lobby successfully (Kennedy, 2009). This resource is important as it advises enterprises on strategies that are most likely to be successful, and which will be politically suicidal. It also provides enterprises with more authority when negotiating with government officials.

The time now is favorable for private companies hoping to influence policy. China's membership into the World Trade Organization in 2001 has resulted in important changes to the regulation of the market by the state (Kennedy, 2009; Lardy, 2012). Kennedy (2009) states that this is an opportune time for enterprises to act these changing policies and try to influence the language of the policy to benefit themselves. This window of opportunity is rare, but enterprises will certainly reap the benefits of possibly establishing an advantageous playing field for the next few decades.

One important resource is the private firm's membership in national associations. According to Deng and Kennedy (2010), one of the key tasks of associations is to "participate in policy discussions". These national associations possess access to officials important in the policy-making process because they are "largely extensions of some branch of a State Council or commission" (Deng & Kennedy, 2010). In addition, many of its employees are past or current officials. Not only are these employees an excellent resource of *guanxi*, they also provide a wealth of information on the mechanisms of the bureaucratic structure. In theory, national associations are important action channels for private enterprises to engage themselves in the policy process.

However, Deng and Kennedy (2010) have identified through their research that although the associations readily utilize their *guanxi* relations, “only one third of (the associations) acknowledged that the government takes the associations seriously”. Together with the limited autonomy of the associations, the true value of a national association as a resource for making private enterprises an influential actor is muted.

The last important resource is private enterprises’ technological know-how. Private enterprises own their own research and development laboratories that run on individual agenda, and hence, are often challenging technology on different grounds from SOEs, who tend to take a more conservative and traditional approach to research. Hence they are able to leverage on their better understanding of cutting-edge technology than most SOEs and government officials. The knowledge of private enterprises are respected and valued by the state, and their technical understanding is taken into account when they draft renewable energy policies. Deng and Kennedy’s (2010) poll indicated that 85% of the companies were invited to testify in government-hosted public hearings, in contrast to 7% of the national associations polled.

Strategies

As mentioned above, most private enterprises are deficient in *guanxi*. One strategy that many enterprises who are serious about lobbying utilize is to hire current or former Party or government officials in order for the firm to tap on their personal networks, thereby internalizing these relationships. Kennedy (2009) identified a trend for companies to set up a “specialized government-affairs staff”. This fast-track method of developing relationships helps them compete against the SOEs, who naturally possess large amounts of *guanxi* (Deng & Kennedy, 2010).

Lobbying has become a serious matter in China. In order to be physically located close to the centers of policy making, many companies have adopted the Western concept of setting up offices of representation in Beijing for the purpose of gaining closer interaction with government officials; even enterprises are unable to afford

an office space in Beijing send their board members on frequent trips to Beijing to gain access to the policy arena (Kennedy, 2009).

According to Deng and Kennedy (2010) the level of influence that a firm is able to exert on the policy-making process depends on the size of the firm; large enterprises are more likely to have more resources such as finances and manpower to commit to being active in the policy process. In order for smaller private companies to make themselves more salient to the policy process, one strategy is for several small enterprises with the same policy interest to collude together. These informal coalitions are one of the main strategies for interacting with policy (Kennedy, 2009).

Because coalition building transcends firm ownership types, it is a very powerful strategy. For example, MNCs and smaller private companies in the renewable energy sector facing similar problems with electricity pricing from a monopolized state grid, may decide to collude to better position themselves when influencing policy (Kennedy, 2009).

The last strategy is for member enterprises to use their national association as an action channel. Although the national associations is a weak resource for private enterprises, this strategy is particularly important for smaller enterprises, since the national associations are given participation rights in the policy process, especially at the local level. With greater access to local level policy-making, small private enterprises will be able to influence the policies that impact them most directly.

2.4 Section Summary

This section provided an in-depth analysis using an adapted framework from Yaffee (2011) which posits that influence over policymaking can be teased out by looking at the actors' individual motivations, resources and strategies. Eight major actors were identified, one of which (LSG) is no longer prominent: the PBSC and

Paramount Leader (under the CCP), LSG, ministries and GSTT (under the Central Government), local government, central SOEs and private entities.

The analysis has shown that although the CCP seems to have reduced its grip over China as a whole, as evinced in lesser paramount leadership, the ideological party is still present in some form in each of the political actors, thus ensuring that the party retains some control over decision-making processes. The party appointment system has also been shown to be a powerful personal motivator, and hence, is a channel through which the party can exert itself in the policy process.

The distinction made between the central government and the local government is reinforced by Lieberthal (2004)'s notion of "fragmented authority". This results in local governments often wielding greater influence than the central government in the policy process. Although the disassembly of the NELG did pave way for NEC and NEA to increase their overall influence in policy, many critics have suggested that the only solution for the central government to regain its influence is to eradicate political infighting by establishing a Ministry of Energy.

Lastly, although central SOEs and private companies in the renewable energy sector have vastly different backgrounds, resources and strategies, their similar motivation in ensuring the financial success in their industry, in addition to facing similar opposition from the monopolized state grid, have led them to innovative strategies to influence the policy process to their favor.

3.0 Case Studies

Through years of research and analysis of the bureaucratic structure in China, policy experts have been able to achieve a basic understanding of the policy-making process. However, documentation of practical examples is limited. This is due to lack of public access to the policy process itself, and the often informal method to which policy is influenced at all levels. The vastness of the policy-making system, both in depth and breadth, has made capturing the entire policy process elusive to scholars.

In the following analysis of two renewable energy resources, this thesis attempts to cover the mechanisms through which the identified actors in section 2 have influenced the specific energy industry. Time limitation has resulted in a brief overview of how the actors have influenced the chosen renewable energy sectors using limited second hand accounts of observations made in the respective sectors.

The omission of other actors from this analysis does not downplay their importance in the entire policy process. For example, despite the lower magnitude of influence from the State Council over the policy process as a whole, approval from the State Council is required before large-scale hydropower projects on international rivers can be built (Magee, 2006).

3.1 Hydropower

Lieberthal and Oksenberg (1988) described the policy-making process pertaining to hydropower as one in which compromise among the stakeholders and decision-makers is increasingly prized. McNally et al. (2009) also echoed the same view, suggesting that new dam projects in China involve a variety of actors, from national-level power companies to regional power grids and vocal citizen groups. Among these varied actors, this thesis has identified SOEs and the ministries as the main actors currently in large hydropower development.

This section will focus on the Three Gorges Dam Project and the hydropower development along the Nu and Lancang Rivers in Yunnan Province. Because of the sheer enormity of these projects, this thesis will only touch very briefly on relevant sections of the projects.

State-Owned Enterprises

There are currently six SOEs in China engaged in hydropower development. Five of the six hydropower SOEs arose from the dissolution of the State Power Corporation of China. These five energy enterprises, China Guodian Corporation, China Huadian Corporation, China Huaneng Group, China Power Investment Corporation, and China Datang Corporation, are all important SOEs in their own right, with varying levels of interest in the hydropower industry.

The sixth player, the CTGPC is housed under the State Council. The CTGPC was founded in 1993 order to internalize the whole Three Gorges dam construction process, from financing, to construction and operation (Ma & Kowsmann, 2011). Because of its status as a SOE, it was granted legal right to utilize state capital for the ambitious project (Lieberthal and Oxenberg, 1988).

Today, the CTGPC has commenced on dam projects at four locations upstream of the Yangtze River. These four projects combined are expected to achieve twice the capacity that of the Three Gorges Project. CTGPC has also expanded its services internationally. In 2003 it acquired a stake in Portuguese hydroelectric company Energias De Portugal (Ma & Kowsmann, 2011).

Magee (2006) identified the China Huadian Corporation (Huadian) and the China Huaneng Group (Huaneng) as major actors in the development of dams on the Nu and Lancang rivers in China. Huadian holds a monopoly over development rights for the Nu river through its Yunnan-based subsidiary Yunnan Huadian Nujian Hydropower Development Company. Similarly, Huaneng has monopolized the Lancang basin through the Yunnan Huaneng Lancang River Hydropower Company.

According to Magee (2006), following a wave of restructuring, Huaneng was simply “given” the Yunnan Manwan Electric Power Generation Company due to its basin-wide monopoly of the Lancang. It is evident that the State Council entrusted Huaneng to absorb the Power Generation Company not simply because of its location monopoly, but because it was required to privatize the power generation company, and the best way to ensure that it would still retain some power over the company would be for it to be attached to a SOE, through which the government still retains much influence over decision-making processes.

Regardless of the true motivations for the move, it is highly possible that the monopoly of Huaneng over Lancang river would allow it to influence policies regarding the construction of future hydropower plants along the river, and of policies pertaining to energy purchasing agreements and electricity supply.

In his paper, Magee (2006) brought up a pertinent observation that over the years, policies and regulations have changed drastically, leading to officials being unclear about their own level of authority vis-à-vis hydropower companies. McNally et al. (2009) echo this view, citing the revision of the Water Law of China as one of the many reasons leading to bureaucrats in the Ministry of Water Resources, trans-provincial commissions, local authorities and other agencies unclear about their “jurisdiction over large hydropower projects”.

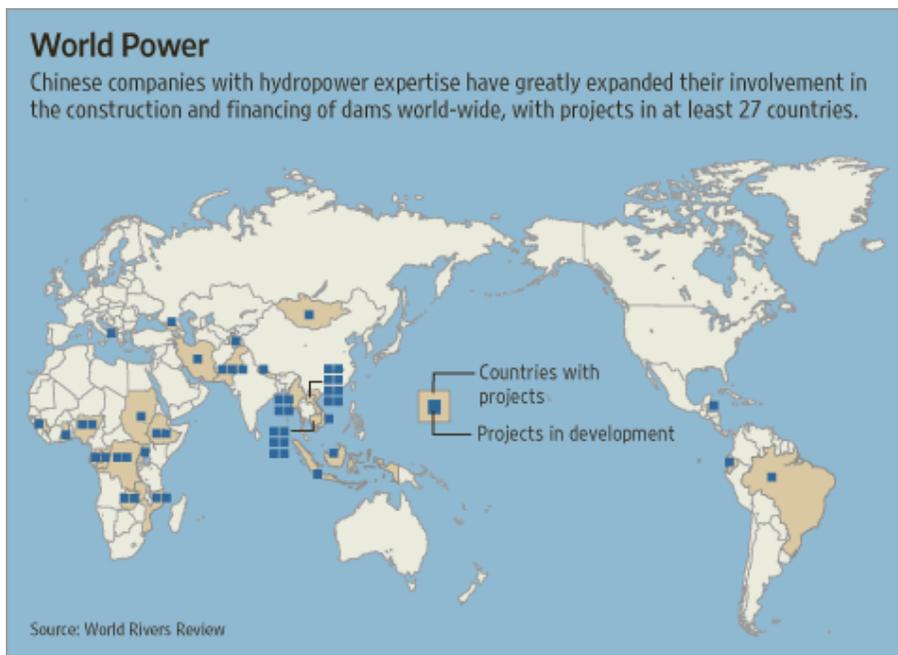
This indicates not only how policies influence power, but also how power from the hydropower enterprises themselves are able to influence policy, so much so that local officials are unsure about their own authority.

The technical expertise of hydropower SOEs over hydropower dam construction has also elevated its level of influence over the policymaking process. Over the years, the institutional knowledge of over 50 years of building and over many of which have broken international records for feats of highest double-arch dams (Jingping-1, 305m) and highest rolled compacted concrete gravity dam (Longtan, 216.5m) (Huang & Zheng, 2009), have given the Chinese the comfortable capability of taking

the tasks of both designing and building various stations to suit different environmental conditions (Chang et al., 2010).

This long, rich history of hydropower development has led the hydropower SOEs to the forefront of global dam export. Today, China's state-run enterprises, such as Sinohydro Corporation, which owns as much as a 50% share of the international market, and other private companies such as Three Gorges Project Corporation, and are involved in over 100 major dam projects all around the world (Chellany, 2011; International Rivers, online). The fact that China's hydropower SOEs have built for themselves an international market and turned into giant income-repatriating organizations has certainly given them reason to flaunt their influence in the policymaking process.

Figure 10: Chinese Expansion of Hydropower Construction



Source: Oster, S. 2007. "China: New Dam Builder for the World" *Wall Street Journal*. <http://online.wsj.com/article/SB119880902773554655.html>

Ministries

Ministries also wield significant power in the policy implementation process. Lieberthal and Oksenberg (1988) suggested in their observations of the initial policy making sessions of the Three Gorges Dam project as one where by the 1980s, political elites were removed from the policy process. Magee (2006) indicates that for hydropower projects in Yunnan, the NDRC's approval, as well as the approval of the relevant ministries and commission, must be sought in order for the project to be allowed to embark on preparatory work.

The input of the relevant ministries such as the Ministry of Water Resources, Ministry of Finance, and the Ministry of Environmental Protection, in addition to other ministries, all are required for the project. Should there be opposition by any ministry, the hydropower company will not be able to proceed with the project application report. Although this is rare, as ministries are expected to put up a united front and cooperate, as we have seen in the analysis section, in-fighting between ministries is not unheard of, and may certainly complicate the policy process. Lieberthal and Oksenberg (1988) acknowledge "opposition" that may result from different actors having different stakes involved. However, the two authors take such "opposition" to be a possible strategic means for the ministries to negotiate for a more consensual outcome, rather than simply throwing in opposition to muddy the decision-making waters.

Hence, the fact that the relevant ministries and commissions are included in the policy depending on their relevance provides them with a channel to influence the process.

The different priorities of the various ministries are also strongly taken into account when implementing a policy. On deciding on what method of cost accounting to use in order to conduct a financial feasibility study on the Three Gorges Dam project, an article in the 1982 journal *Renmin Changjian* concluded that the use of a financial feasibility study cannot and should not be used in the Chinese context because of the different priorities of the ministries resulting in multi-purpose nature of the project

outcome, such calculations would be rendered impractical (Lieberthal & Oksenberg, 1988).

In comparison to the ministries, the local government is not as influential over the process. In Figure 10 below, the dotted line leading from the provincial government offices compared to the solid line between Project Initiation and NDRC's Project Concept Evaluation shows that while the provincial government is involved in the policy implementation process, its influence is weak. According to Magee (2006), while the input provided by provincial-level units may be taken into consideration, but is not considered crucial.

Another reason for why ministries are relatively less influential than SOEs in the policy process can be seen in the requirement of an Environmental Impact Assessment (EIA) to be done. The EIA committee is a subcommittee of SEPA. Although SEPA is listed as an agency, it has recently been promoted to ministerial ranking, making it equal among ministries (Yang, 2008). Magee (2006) has indicated that although the EIA committee is an important actor in the policy implementation process, many large hydropower SOEs have been known to ignore them. As mentioned in an example in the section on SOEs, despite publication by SEPA of CTGPC's failure to carry out an EIA, thus ordering for the suspension of its projects, the CTGPC ignored SEPA's instructions. This flagrant disobedience indicates that ministries often are not as influential as SOEs when it comes to large hydropower policy implementation.

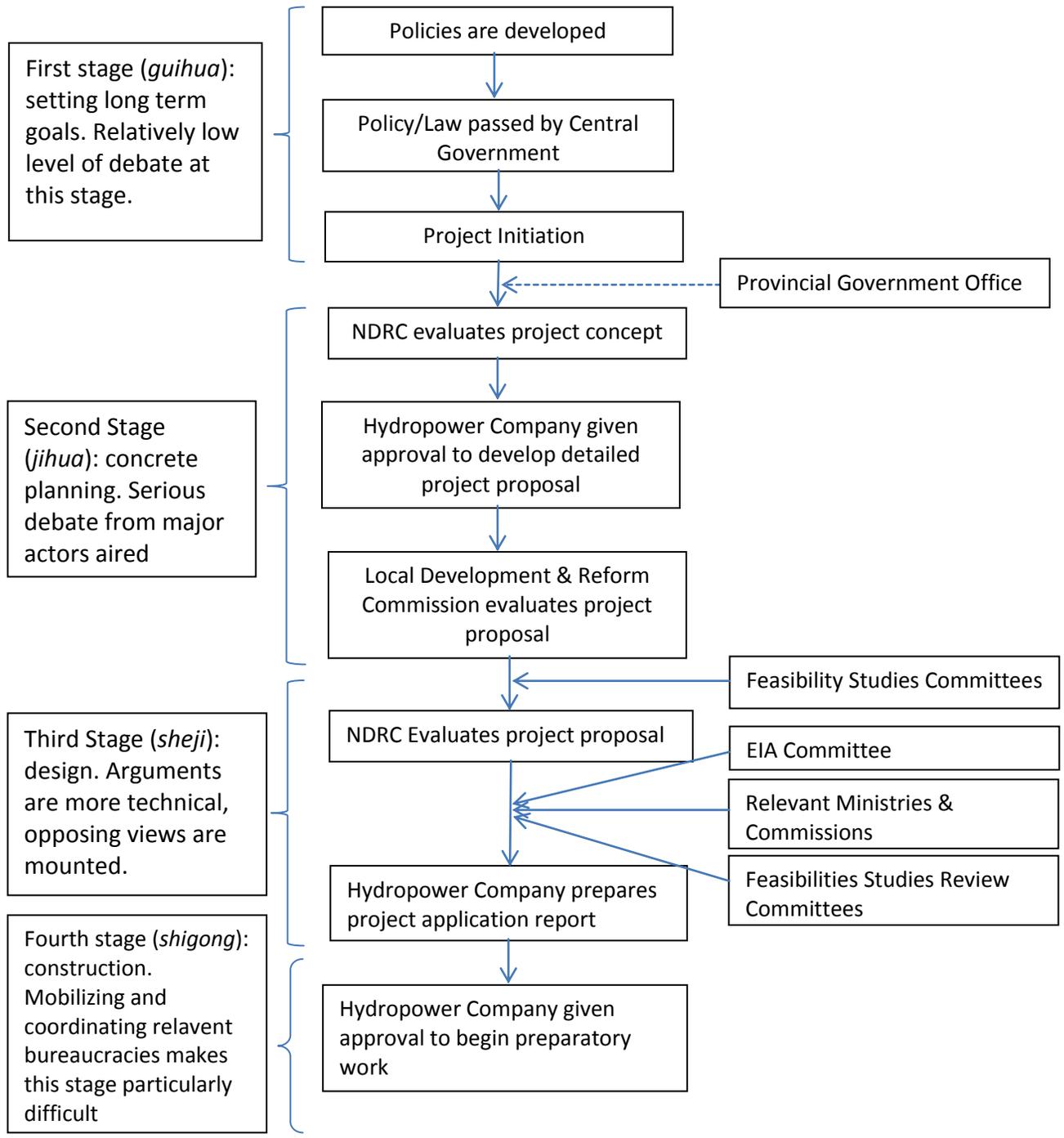
Paramount Leader

In the past, although the task of overseeing the Three Gorges Dam Project falls under the direction of the Premier, several political experts on China have also pointed to the immense amount of influence Paramount Leaders such as Mao Zedong and Deng Xiaoping had on hydropower policies.

There have been reports that prior to his death in 1976, Mao Zedong himself was involved in the decision-making process in the Three Gorges Dam project (Heggelund, 2004). Not only did he personally decide on appointments (such as Premier Zhou Enlai) within the project, he also influenced the speed at which the project developed. For example, Heggelund (2004) reports that Mao not only personally reviewed ministerial reports, but also facilitated transfer of resources to the project by deciding to “provide resources for a third line of industries in the south-western parts of the country”, under which the Three Gorges Dam project would have qualified.

In comparison, to Mao, Deng Xiaoping’s coming to power in China brought emphasis on science and technology back to the nation (Lieberthal, 2004; Saich, 2011). This allowed science to be brought back into political decision-making via the inclusion of research and policy institutions, especially over the Three Gorges Dam project (Heggelund, 2004). According to Heggelund (2004), think tanks such as the State Committee for Restructuring the Economy and the Chinese Academy of Sciences were set up by Zhao Ziyang and Zhu Rongji respectively and consulted regularly, especially on matters pertaining to the Three Gorges. This is in stark contrast to dam-building policy-making under Mao, where decisions were made by the top leaders—even those with little or no background in engineering—after reviewing recommendations from ministries and commissions included in the project.

Figure 11: Schematic of Decision-making within the Policy Implementation Process for the Hydropower Industry ¹⁰



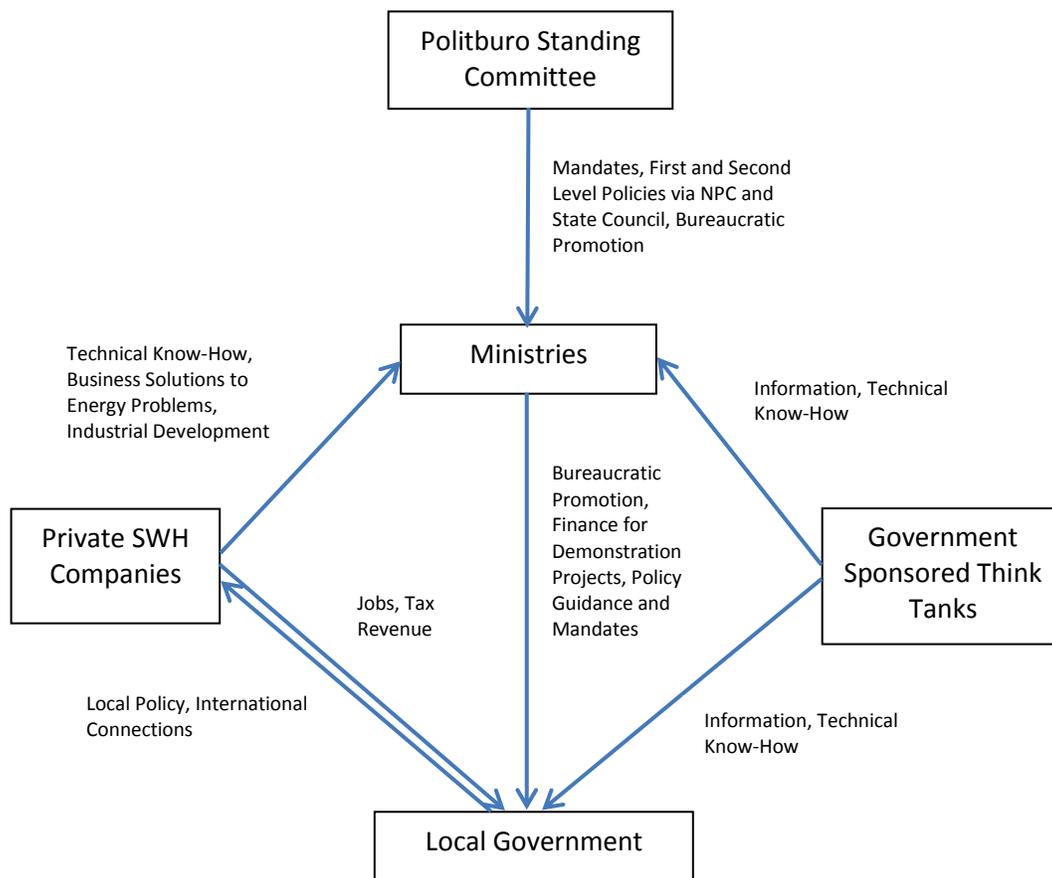
¹⁰ Adapted from Lieberthal, K. & Oksenberg, M. 1988. "Policy Making in China: Leaders, Structures and Processes" Chapter 6 on the Three Gorges Dam. The original concept of five major stages has been reduced to four; and Mcgee, D. 2006. "Powershed Politics: Yunnan Hydropower under Great Western Development." This flow chart shows mainly the policy implementation portion of the policy process.

3.2 Solar Water Heater

The SWH industry is primarily characterized as a perfect competition market with a large number of sellers. Martinot and Li (2007) call this economic landscape “fragmented” with few dominant players. As of March 1st 2012, there are 200 standard-compliant enterprises and around 1,000 small scale businesses (Wood, 2012). Additionally, while the market has shown to increase concentration, the top ten SWH businesses currently only claim 25% of market share (Wood, 2012).

SWH use in rural and urban areas has been well studied. Unlike the hydropower industry, where research indicates the ministries and SOEs to be the main actors, literature has revealed that the success of SWH in several parts of China has depended tremendously on the private sector and on local government support and initiatives.

Figure 12: Major Actors in SWH Industry and their Interaction¹¹



PBSC

The PBSC has been identified weakly as an actor in the SWH policy process. Similar to the hydropower industry, where the first stage (*guihua*) lies in the setting long term goals, the PBSC is in charge of providing overarching policies that give direction to the relevant bureaus to carry out. While the NPC is the main government body that passes laws, the NPC has consistently been referred to as a “rubber stamp” legislative body, and takes much of its direction from the decisions

¹¹ Adapted from Figure 2 in Li et al. (2011) “China’s Transition to Green Energy Systems: The Economics of Home Solar Water Heaters and Their Popularization in Dezhou City”

made by the PBSC. Hence, this thesis has determined that the PBSC is an important actor in the first stage of the SWH industry’s policy process instead.

Two important policies that have been passed by the NPC are shown in the table below.

Table 6: Two Examples of Policies and Programs Instituted by the Central Government that Impact the SWH Industry

Year	Policy/Program	Details
2007	Home Appliances Going to the Countryside	Home appliances under the subsidy list were eligible for partial financial subsidies (RELaw Assist, 2007, Li et al. 2010)
2007	Medium-and-Long Term Development Plan for Renewable Energy	Expand total collection area of solar water heaters to 150 million m ² by 2010 (Mastny, 2010, <i>Medium and Long Term</i> , 2007)

The overall influence of the central government on the SWH industry specifically has been relatively low. Although the central government has clearly provided direction for the development of the SWH industry and for greater SWH uptake by households, much of the policies’ successes depended on the local government. For example, according to Li et al. (2011), the “Home Appliances Going to the Countryside” policy provided insufficient incentives for rural households to switch to a SWH system. Additional subsidies had to be provided by the local government in order for the locale to reach the SWH goals set by the central government.

The “Medium-and-Long-Term Development Plan for Renewable Energy” was also without its failures. The national goal stipulated in the Plan was to achieve 150 million m² by 2010. However, by as early as 2009, the industry had surpassed this goal with a total of 177,000m² of installed SWH. The policy was thus redundant for

the SWH industry, and had to be revised. This anecdote shows the large disconnect between the ministries and the on-the-ground scenario. Their inability to set realistic, impactful targets reflects on their inadequacy in policy setting.

In comparison, the central government is able to indirectly influence local policy by providing sticks and carrots to local officials. Carrots include promotion and financing for demonstration projects (Li et al., 2011), while sticks include demotion, cutting of budgets etc. Because budgets to local government offices are dependent on several factors, it is varied, according to the negotiation powers of the local and central officers. Li et al. (2011) surmises that a relation between local achievements was brought on by a successful SWH industry development and incentives awarded to the local government. However, the paper cautions that this positive relationship is conditioned on the premise that the SWH industry developed is successful.

The central government has also provided several resources to make this industry succeed. Money for pilot projects in solar space heating and cooling (*Recommendations for Improving*, 2009) is dispensed by the government. In fact, Han et al. (2010) suggest that the funding of demonstration projects was the primary method in which the central government had positively influenced the implementation policy phase of the SWH sector.

The decision to decentralize the economy also inevitably impacted SWH policies. By forcing local governments to become more entrepreneurial, and by making their provincial budgets conditional on local government revenues, it forced local officials to develop local policies that would help nurture the SWH industry.

Ministries

The ministries have not proven to be a significant actor in policy promulgation in the SWH industry. As shown in the diagram, ministries are more a channel through which first and second level policies flow from the top to the bottom. Although they have developed several important supporting policies such as the “Specification of

Applied Technique for Solar Energy Application” (Wang & Zhai, 2010), their presence is minimal.

However, their ability to cooperate and coordinate with one another and develop plans in partnership with one another has resulted in some influential policies, shown below in table 9.

Table 7: Examples of Policies and Programs Promulgated by the Relevant Ministries

Year	Policy/Program	Details	Ministry
2005	Renewable Energy Law	By 2010 total heat collecting area of China’s SWH will be 150million m ²	NDRC
2005	Specification of applied technique for solar energy application	Specifications for building-integrated SWH system	Ministry of Construction
2007	National Solar Thermal Utilization Conference	Local government were encouraged to issue local mandatory regulations for SWH usage and to pledge financial support for its dissemination	NDRC and Ministry of Construction
2007	Implementation Plan on Promoting Solar Thermal Utilization in China/Plan on Enforcement of Utilization of Solar Energy Heating Nationwide	Mandate SWH in all new construction, priority for major hot water consumers such as hospitals, schools, restaurants and swimming pools.	NDRC

Sources: *Medium and Long-Term Development Plan for Renewable Energy in China* (Abbreviated Version, English Draft). 2007. National Development and Reform Commission, *People’s Republic of China*; and *Recommendations for Improving the Effectiveness of Renewable Energy Policies in China*. 2009. *REN21 Secretariat*.

Government Sponsored Think Tanks

As the government sponsored think tank was only established in February this year, there have been no documented examples of the institution's recent actions pertaining to the SWH industry. However, we can expect that over time, as CNREC settles into its new role, it will play a larger role in the policy process.

As indicated in the graph above, local officials will be able to access information from the office on how renewable energy strategies to pursue. The ability for the CNREC to provide information to local officials as well as consult them on how best to use the information will give the CNREC a very important platform to influence the local government's policymaking process. Hence, it will have direct influence on the local policy process.

Similar to how it will influence local policies, by providing policy consultation services and data to central policy makers, CNREC will also be able to influence centrally-mandated policies as well.

The ability for CNREC to influence all levels of policy will make CNREC an important actor in the policy making process in the near future.

Local Government

The local government has been widely believed to have provided the most significant positive influence on renewable energy policy.

Local governments, with guidance from the central government and its ministries, have promulgated their own renewable energy policies. They are in charge of the entire policy process—from drafting to monitoring policy implementation. The table below shows some cited examples of policies promulgated at the local level.

Table 7: Examples of Local Level Policies that Impact the SWH Industry

Year	Policy	Details	City
2005	Notice of Fully Popularizing Solar Water Heaters on Newly Constructed Buildings	Requires SWH on all new or renovated apartment buildings	Dezhou
2006	Rebate for SWH Purchase by Rural Households	On top of 13% rebate offered by central government, additional 1,000Y subsidies provided by local government	Dezhou
2007	Management Measures on Building Energy Savings	Installation of solar water heater systems made compulsory in certain houses strongly encouraged in other types	Zhejiang
2005	Program of Exploiting and Using Solar Energy	100,000m ² of solar hot water systems integrated with buildings by 2007	Shanghai

Sources: Wang, R.Z. & Zhai, X.Q.. 2010. "Development of Solar Thermal Technologies in China" Energy Vol. 35 p.4407-4416; and Li et al. 2011. "China's Transition to Green Energy Systems: The Economics of Home Solar Water Heaters and Their Popularization in Dezhou City. Energy Policy. Vol 39 p. 5909-5919

In Shanghai, local officials developed and implemented the "Program of Exploiting and Using Solar Energy", which called for 100,000m² of solar hot water systems integrated with buildings by 2007 (Wang & Zhai, 2010). The local officials did not just leave off from there. To show its commitment to the policy and in an effort to spur SWH system uptake, the Shanghai government invested in SWH systems in beadhouses (Wang & Zhai, 2010). Li et al. (2011) were involved in the drafting of Dezhou's low carbon economy development plan, commissioned by the Dezhou municipal government.

One example of how it shifted its attitude was the promulgation of the "Rebate for SWH Purchase by Rural Households" (Li et al., 2011) in 2006. The additional rebate of 1,000 Yuan per SWH equipment purchased is a hefty enough to impose large

burden on any province's budget. However, the determination for the government to support this industry is evidenced in its decision to provide generous economic incentives to the public in order to boost installation rates.

Local governments are also in charge of determining how much resource to expend on policy enforcement and monitoring. Without commitment of resources by the local government, the efficacy of the policy may be diminished. Despite the high costs of SWH in China, these local policies have helped Chinese households overcome the high transactional barriers of SWH. The fact that Dezhou boasts a high installation rate—75% in urban households and 15% in rural households—suggests that the policies provided by the local government must have provided significant positive outcomes.

Overall, the strong political will committed by the local government to designing and adopting policies that are favorable to the SHW industry will reduce uncertainties for the private enterprises. These policies are believed to reassure investors and greatly bolster the renewables industry (Sheridan, 2012).

Han et al. (2010) have suggested that amongst others, the preferential local policies have resulted in a vibrant development of SWH manufacturing belts in several Zhejiang cities. Similarly, in Dezhou city in the province of Shandong, the decentralized approach was observed to be key to successful SWH deployment (Li et al., 2011). The authors identified that the high installation rate of SWH in Dezhou is due to the local government's desire to develop local businesses and the local economy, especially after the shift in the local government's attitude in 2006 upon realizing that the SWH industry had a strong future and consequently, a strong possibility of increasing local revenue and providing jobs. An estimated three out of every ten jobs in Dezhou is connected to the SWH industry (Li et al., 2011).

An increasing dependence of local bureaus on the local government for revenue has resulted in better coordination between the bureaus. For example, if the SWH industry is considered a development priority by Zhejiang government, the relevant bureau are required to overcome conflict, pool resources, contribute and cooperate

in implementing the relevant policy approaches. A case study of solar energy in Zhejiang province supports this view. Han et al. (2010) indicated several individual and combined contributions of the various provincial-level governmental department, from the Zhejiang Department of Science and Technology for protecting the intellectual property rights of solar energy technologies and coordinating international cooperation, to the Zhejiang Development and Reform Commission for developing and implementing mid and long-term strategies for local solar energy development, the Environmental Protection Bureau, the Department of Construction, Quality and Technical Supervision Bureau, Department of Finance and the Administration of Industry and Commerce. The coordination of the local bureaus certainly prevented conflicting policies at the ground level from being promulgated, and assisted in streamlining the policy implementation process.

The total level of coordination among all the local agencies involve, however, may not be sufficient. However, according to Han et al. (2010), pitfalls of the local government in ensuring effective policy implementation have also been identified—conflicts between city administration and estate management has resulted in decreased installation rates due to estate management banning SWH installation on grounds of not being aesthetically pleasing. Two such regulations, the “Regulation on City Appearance and Sanitary Conditions in Hangzhou City” and “Regulations on City Appearance and Sanitary Condition in Zhejiang Province” both resulted in planning officials prohibiting the installation of SWH units on residential buildings within their locale because of they were considered to have violated the above policies. Although beauty is subjective, the trivial but conflicting nature of the local policies indicates that more coordination is required to ensure industrial success.

The level of influence of provincial-level governments in all sections of the policy process should not be overlooked. In the case of Dezhou, Li et al. (2011) explained that the local government was able to mobilize its contacts with upper-level government to convince them to host the fourth International Solar City Congress, thus exposing the local industries to international markets and players for future partnerships, as well as cementing Dezhou’s reputation as China’s place leading

province for SWH technology. It is the ability of local officials to utilize its *guanxi* to great effect that makes the local government a powerful actor in any policy process.

Private Companies

It has been widely observed that the influence of the other actors pale in comparison to the efforts by the private industry themselves (Li, 2005; Wang & Zhai, 2010, Li et al., 2011). Private SWH enterprises, especially the first few in the market, forged much progress with very little help from the central and local governments. Although there is little academic research focused on the SWH industry from the standpoint of the private companies, some key points stood out from whatever materials were available.

In the Dezhou city example, industrial leadership and industrial agglomeration effect were important reasons behind SWH's success. The industrial agglomeration is due to an industrial belt where enterprises, suppliers and associated institutions in solar energy are geographically concentrated (Li et al., 2011). Not only does industrial agglomeration bring about economies of scale, they also enable the industry to collude and lobby the local government more effectively.

Associations have also proven useful in protecting the SWH industry from counterfeit SWH systems. The counterfeit products are shoddily constructed, and undermine public confidence in the industry. According to Xinhua News (Xinhua, 2011), although authorities are aware of the severity of the situation, solutions such as mandating quality standards will still require two to three years to pass. In Zhejiang, Han et al. (2010) has indicated that SWH enterprises joined the Zhejiang Solar Energy Industrial Association in order to combat problems with false advertisement, counterfeit products and malfeasant competition.

Himin Solar Corporation Limited stands out as a stellar example of innovation and entrepreneurial success in a novel industry. Founded in 1995, the Himin Group today has grown into a large international company with an employment of over

50,000 worldwide (Himin Company Website, online; Martinot & Li, 2007). The president of Himin Group, Huang Ming, was also given the prestigious award of China's most influential private entrepreneur in 2003 (Martinot & Li, 2007). With his success in maneuvering the SWH industry, Huang Ming himself was chosen as a deputy on the 10th NPC to be involved in the drafting of the REL (*China's Solar King*, 2011). As a result, Huang Ming has personally influenced government policy.

Himin's successes today betray the steep uphill climb the enterprise had to take to get to where it is today. When the private enterprise first started out, less than 1% of the Chinese population had heard about solar energy (*China's Solar King*, 2011), and the company received little support from the government.

In order to cultivate the SWH market and educate customers on the benefits of SWH equipment, Himin embarked on several publicity campaigns, such as a periodical on solar energy in 1996, which led to the dissemination of about 100 million copies, and an outreach fleet in 1997, where dozens of company vehicles were dispatched nationwide to promote SWH to a greater number of citizens (Mastny, 2010). Himin Solar Corp has also been heavily involved in the conceptualizing and development of Dezhou's Solar Valley. Solar Valley is turning into a world-class destination for solar energy technology development.

While the two case studies as well as the Himin Group story are unique, the high rate of SWH installation and the growing SWH industry in Dezhou and Zhejiang, as well as the success of Himin Group are stellar examples of what the actors in China's renewable energy policy are capable of accomplishing within the SWH industry.

3.3 Section Summary

Section 3 highlighted two renewable energy industries in China— the large hydropower and the solar water heating industry. The two industries have shown that the actors have varying levels of influence over policy, depending on the history

of the industry and on the magnitude of the impacts of the projects. The large hydropower projects have a critical and large scale of societal impacts, in terms of types, and magnitude. The prevalence of large hydropower projects in history also enable the central government (especially the ministries) and the CCP to become embedded in the policy process.

In comparison, the SWH industry is younger, and focused on local implementation. The low level of economic and negative environmental externalities, as well as the strong symbiotic relationship between the local government and the private SWH firms, results in SWH remaining in the domain of the local government.

Although the two industries are a poor reflection of the entire renewable energy scene in China, it provides a glimpse into the real-world mechanism of actors influencing renewable energy policy.

4.0 Evaluation

4.1 Comparison of Relative Influence over the Policy Process

In the context of two renewable energy sectors, the analysis of the actors has shown that:

- Although the true working of the **PBSC** is unknown, it has been identified as the ultimate decision-maker over the trajectory of China's renewable energy industry. Changes to the PBSC in the near future hence warrant analysis; the outcome of which is currently unclear due to the upcoming Party Congress.
- The concept of a **Paramount Leader** has been rejected for some time now. While the notion of a Xi-Li relationship similar to the Hu-Wen relationship is predicted to lead to the promulgation of favorable policies, the increasing collective decision-making nature of the China's policy process will reduce the duo's influence over the renewable energy policy process.
- **SOEs** and **private enterprises'** motivations for maximizing profit and increasing output are generally aligned with some of the interests of the central government and Party.
- SOEs and private companies are also able to influence the policy process in different ways—SOEs by holding a monopoly of the energy sector, and by secondment of their senior managers to the SASAC, while the strategy for private companies is by successful cutting-edge technologies, as shown by Himin Group's president's involvement in the formulation of the REL.
- While central SOEs have an advantage over private companies in their embedded *guanxi* and multiple hats that their executives wear as both as members of the SOE and the Party, private enterprises have overcome their *guanxi* deficiency by hiring current and former Party officials to tap on their relationship networks, and by forming associations not entirely autonomous from the government for use as channels to influence the policy process.

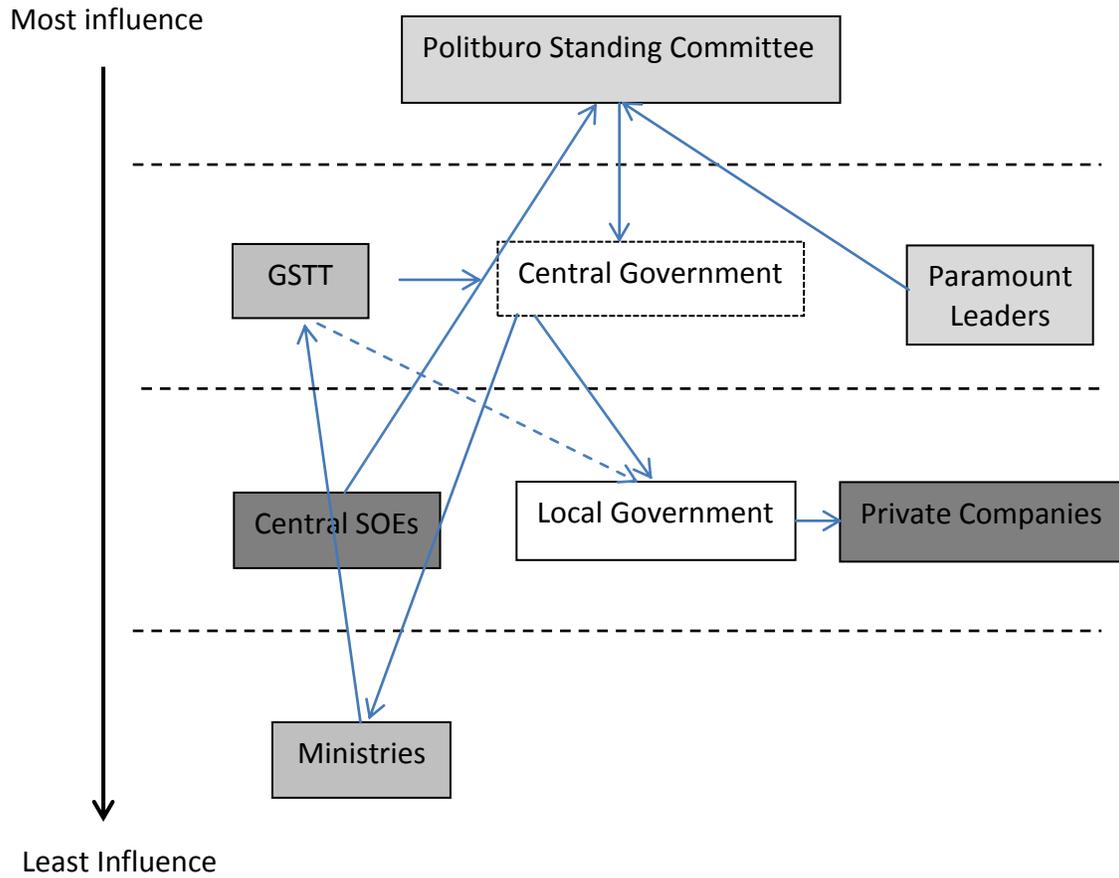
- SOEs also have an advantage over private companies in their higher hierarchical standing over the ministries. This enables them to get away with disobeying ministerial policies. An example provided was CTGPC's infraction of SEPA's EIA standards. Private companies do not have the political capacity to follow suit.
- Large SOEs are able to most directly act upon the motivations of the Politburo Standing Committee and Paramount Leaders, which are to ensure economic growth and social stability, via its ability to source for business opportunities outside of China, and by providing employment.
- **Ministries'** motivations are primarily based on defending their turf and on ministerial officials' desire for personal promotion. Unless a "super ministry", for example a Ministry of Energy is created, little improvement in government coordination will be achieved. As a result, they are often caught up on the smaller issues and are unable to see the bigger picture of what it could mean for them to influence the politics. Officials may also be disincentivized to participate in the policy process as their proposals may run counter to the desires of their patrons, affecting the patron-client ties. As such, as shown in the SWH example, they often simply act as channels for policy to flow from the top to the bottom.
- Ministries also often cannot afford to spread their scarce resources thin on influencing policy. They would rather ensure that they succeed in their given tasks.
- The tiao/kuai relationship of the **provincial government** to the ministries ensures that provincial governments are more influential than ministries over policy matters.
- While the provincial governments have not shown to be especially influential in the large hydropower sector, they have certainly played a significant role in the SWH sector. The symbiotic relationship between the provincial government and the SWH industry, together with the cadre evaluation system for local leaders, suggests that the strategy of the local

government supporting the new SWH industries can be used in other sunrise renewable energy industries.

- The **Government Sponsored Think Tanks** CNREC has yet to prove its might, but it already stands in the enviable sweet spot of being trusted with policy consultation and information sharing with policy-making bodies. The direct access to policy-making officials will make it a very influential actor in time to come.

Ultimately, this thesis has evaluated the relative levels of influence of each actor vis-à-vis one another. In comparison to Figure 4 which showed the theoretical levels of influence, major shuffling of the actors was involved. All in all, this thesis has shown that actors driven by market forces—the private companies and SOEs— as well as the GSTT, particularly CNREC in this analysis, will provide the most influence over the policy making process for the renewable energy industry.

Figure 13: Evaluated “True” Levels of Influence and Flow of Influence of the Major Actors in China’s Renewable Energy Policy-making Process.



5.0 Conclusion

All seven actors have been shown to influence the policy-making process in varying degrees and at various segments of the process.

As a result, it is difficult to conclude exactly *which* actor is the most influential, or least influential. However, this thesis has made it possible to evaluate them vis-à-vis one another using the adapted political analysis framework, and place them diagrammatically in a hierarchical chart.

The results show that enterprises have increasing influence over the policy-making process. This is consistent with efforts to reform the economic sector in China, as well as to increase GDP and expand international trade. Enabling enterprises to exert influence over the policies that impact them will allow China's market to grow in the short run. How the dynamics will change between the CCP and the industry in the long run remains to be seen.

The results also show the ideological party's determination to remain relevant in the entire policy process, from approving drafts, to the local implementation stage. One key method of maintaining control—through the Paramount Leader and his political ideas—is becoming less pertinent in China's culture today. However, the influence of the PBSC should not be underestimated. Together with its embeddedness throughout the political system, the CCP retains its ability to exert influence at every stage of the policy-making process.

5.1 Summary and Recommendations

This thesis identified key actors in the policy-making process in the renewable energy sphere, and placed them in the renewable energy arena using the hydropower and SWH industries as case studies. It has been determined that the major actors can be categorized into four levels of increasing influence on the policy-making process.

The research results make sense, given the political backdrop and repercussions of economic reform, as well as the positive performance of private companies forging new grounds internationally in the renewable energy industry.

The results posit three suggestions:

Firstly, given the growing influence of the market-based organization, policies pertaining to the renewable energy will not only certainly continue to be more supportive of the industry as a whole, but also be expected to take into account specific, detailed methods in which the industry can benefit more directly from. For example, financial instruments that will alleviate production costs and improve guaranteed access to the grid, are some aspects of policies that we can be certain to see more of in the near future.

Secondly, the research also suggests that unless a drastic change is made to the way ministries operate and function, they will be more likely to take a backseat in the policy-making. Although ministries such as the NDRC and NEC will still command a strong presence in the policy-making process, their true influence on the policy-making process has been shown to be minimal. In order to ensure that ministries remain relevant, more government effort will be needed to reign in the ministries, reduce their narrow focus on inter-agency fighting, and give them greater authority, especially in the policy implementation section.

Lastly, the research shows that although the ideological stronghold of the CCP is weakening over the policy-making process overall, the CCP still commands significant indirect influence over the direction of policy-making in China, via mechanisms such as power for appointments in the Party, the dual positions in the Party and SOE executive board, and lastly, the parallel and intertwining structure of the Party and the government.

5.2 Limitations and Future Research

The author is aware of the limitations of this thesis.

One research limitations include the omission of additional actors have been identified to be active in the policy process. Future research should include more actors in the analysis to better support predictions on the shape that renewable energy policies will take in the future.

Instead of looking at all the actor that influence the policy process for the renewable energy sphere, this thesis pared it down to looking at—what it as evaluated to assume—the main actors. Other actors such as the public, scientists, the media and global audience, for example, have become increasingly important in environmental politics and policy-making today. In a strikingly relevant comment by Heggelund (2005), “(i)n response to proposals to build thirteen dams on one of China’s last wild rivers, Chinese NGOs, news journalists, and researchers launched an anti-dam campaign that led Premier Wen Jiabao to call a temporary halt to dam building”.

The increasing awareness of the Chinese public, brought on by rising education levels, the proliferation of media coverage, increasing frustration at environmental and health problems brought on by pollution and perhaps also frustration at corruption, to which they attribute the environmental and health problems, is certainly growing. The Chinese government, necessitated as of late to increase levels of public participation, has acquiesced to western concepts of engaging the public in open discussions, meetings and forums.

The global audience, which includes NGOs both local and international, international markets, the World Trade Organization as well as competing manufacturing companies and trade unions, have also influenced the policy process much, much more than ever before. One simply has to bring to mind the 2011 inquiry on China’s “dumping” of solar panels on the world market, with international observers coning

the phrase “China prices”¹² to remind us of the increasing interaction between the globe and China.

Last but not least, the media. Like a volcano, over the past decade Chinese media has erupted into a frenzy, reporting on previously taboo subjects, such as corruption, the prevalence of gangs, the perceived failures of the government, and the woes of the masses. The increase in magnitude and strength of public protests over environmental degradation, in addition to the availability for Chinese citizens to view these protests from the comfort of their own home, is fostered by social media such as China’s version of Facebook (*RenRenWang*), Youtube (*tudou* and *youku*) etc, as well as more liberal media, such as *Caijing* magazine, has promoted social awareness and movement for more environmental protection. Although China is still a centrally-controlled country, as mentioned in Section 2, leaders are becoming less deaf to the voices of the Chinese people, and their voices will become increasingly more resounding to the ears of the Chinese political leaders.

In addition, this thesis has chosen to give a condensed and limited view of the motivations, resources and strategies of the actors in order to better fit the task of evaluating these actors. A broader framework for analysis that takes into account other important characteristics of the actors could be used for future research.

Another research limitation includes the observation of only two renewable energy industries, which may result in a biased understanding of the actors in the renewable energy policy process. Time permitting, a more comprehensive and extensive analysis of the individual renewable energy sectors should be employed to tease out less visible but more influential actors that would be valuable to analyze in greater detail.

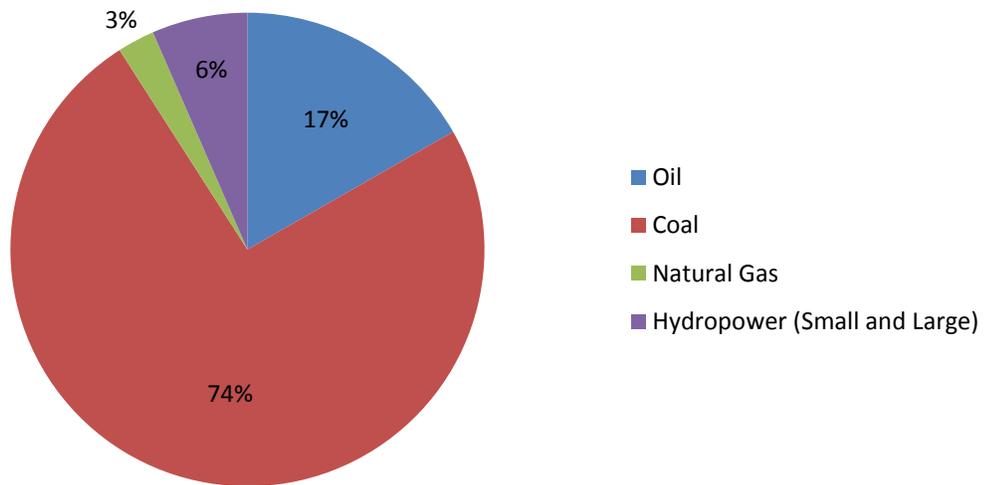
¹² The Chinese government was accused by seven American solar PV companies of providing export subsidies, or of Chinese solar manufacturers selling its solar panels for less than the cost price of manufacturing and distributing them. The Chinese solar PV industry later countered in November 2011 that American subsidies and other policies provided to the renewable energy sector had provided them with an unfair advantage over China’s renewable energy industries.

Lastly, a limitation is the research method employed. Language barriers and limited access to primary material resulted in reliance on second-hand information and international reports written in English. Greater emphasis should be placed on obtaining first-hand information for future research.

6.0 Appendix

6.1 Total Production of Energy and its Composition in China

China's 2007 Energy Consumption by Resource Type



Source: Zhang et al., 2011. "Modeling the Relationship Between Energy Consumption and Economy Development in China" *Energy* Vol. 36 p.4227-4234

6.2 Summary of Five Year Plans

Five-Year Plan	Period	Comments
1	1953-1957	<ul style="list-style-type: none"> - Soviet Economic model adopted - Focus on industrial development and economic growth - Gains in agricultural output achieved
2	1958-1962	<ul style="list-style-type: none"> - Emphasis on heavy industry development - Strengthening of army, and of socialism via property transfer to the state - 20 million peasants died of starvation
3	1966-1970	<ul style="list-style-type: none"> - Agriculture development received top priority - Emphasis on national defense in light of war
4	1971-1975	<ul style="list-style-type: none"> - Infrastructure construction took precedence - While initial targets were lowered, all major economic indices were fulfilled or exceeded ahead of schedule due to favorable economy.
5	1976-1980	<ul style="list-style-type: none"> - Provided suggestions on setting up independent and comparatively complete industrial and national economic system - Economy developed too rapidly, leading to shift in principles to readjustment, reform, rectification and improvement
6	1981-1985	<ul style="list-style-type: none"> - Redraft resulted in a comprehensive plan that lay strong foundation for national socio-economic development - First time efforts to strengthen environmental protection was mentioned
7	1986-1990	<ul style="list-style-type: none"> - First time that an all-round plan for social and economic development was created at the start - Included language on economic efficiency and opening doors for more cross-country economic and technology exchanges
8	1991-1995	<ul style="list-style-type: none"> - Economy experience annual growth of 11% - Over 1,100 cities were opened to foreign trade - Control over population growth was achieved
9	1996-2000	<ul style="list-style-type: none"> - First medium-length plan made under socialist market economy - Looked to continue modernization, population control, elimination of poverty, GDP growth and establishment of a modern enterprise system
10	2001-2005	<ul style="list-style-type: none"> - On an environmental front, sought to increase forest coverage and urban greenery - Measures taken to protect and save natural resources - Reduction of major urban and rural pollutants
11	2006-2010	<ul style="list-style-type: none"> - Structured guidelines into four components: Economic growth; Economic structure; Public service and people's life; and Population, resources and environment. - Suggests increasing environmental awareness
12	2011-2015	<ul style="list-style-type: none"> - Suggestions to move away from heavy to light industry and service sector - Included language on nuclear power development - Emphasis placed on construction of large-scale hydropower plants in Southwest China

7.0 References

- “The 12th Five-Year Plans for Renewable Energy Development is to be published. PV Installed Capacity Reaches 14 Million KW” 2012, February 24. *Meeting China*.
<http://www.meeting-china.com.cn/Macropolicy/106.html> (last accessed 4/13/2012)
- Anderline, B. 2012, March 15. “Bo Purged by Chinese Leadership” *Financial Times*.
<http://www.ft.com/cms/s/0/94e2d35e-6e46-11e1-baa5-00144feab49a.html#axzz1q5JqOfA7> (last accessed 4/13/2012)
- Aylott, C. 2012, March 13. “Suntech Sets World Record 20.3% Efficiency with New Solar Cell” *Emerging Money*. <http://emergingmoney.com/china/suntech-sets-world-record-20-3-efficiency-with-new-solar-cell-stp-tan/> (last accessed 4/13/2012)
- “Backgrounder: China’s 12th Five-Year Plan” *US-China Economic & Security Review Commission* 2011
- Bodmer, F. 2003 “On the Use of Incentive Pay in Chinese State-owned Enterprises: The Role of Hierarchy”. *Labor* Vol. 17(2) p. 299-314
- Breslin, S. 2008. “Do Leaders Matter? Chinese Politics, Leadership Transition and the 17th Party Congress” *Contemporary Politics*. Vol.14(2) p. 215-281 Publisher: Routledge
- Buckley, C. 2010, November 23. “China says it is World’s Top Greenhouse Gas Emitter” *Reuters*
<http://af.reuters.com/article/energyOilNews/idAFTOE6AM02N20101123> (last accessed 4/13/2012)
- Cabestan, JP. 2009. “China’s Foreign and Security policy Decision-making Processes under Hu Jintao”. *Journal of Current Chinese Affairs* Vol. 38(3) p. 63-97
- Chang, X.L., Liu, Z., Wei, Z. 2010. “Hydropower in China at Present and its Further Development” *Energy* Vol. 35 p. 4400-4406
- Chellany, B. 2011. “China’s Dam Frenzy.” *Project Syndicate*. <http://www.project-syndicate.org/commentary/china-s-dam-frenzy> (last accessed 4/13/2012)
- Chen, Z. & Zhang, B. 2011, May 1. “China’s Energy Agency Gets New Director.” *Caixin Online*.
<http://english.caixin.com/2011-01-06/100214442.html> (last accessed 4/13/2012)
- “China Sets Up National Energy Leading Group” 2005, June 4. *People.com.cn*
http://english.peopledaily.com.cn/200506/04/eng20050604_188432.html
(last accessed 4/13/2012)
- “China’s 12th Five-Year Plan: Overview” 2011, March. *KPMG Advisory (China) Limited*. Accessed from
<http://www.kpmg.com/cn/en/IssuesAndInsights/ArticlesPublications/Documents/China-12th-Five-Year-Plan-Overview-201104.pdf> (last accessed 4/13/2012)

- “China’s Solar King Huang Ming: Look at The Basics First” 2011. *Green Purchasing Asia* June 2011 Issue <http://www.greenpurchasingasia.com/content/chinas-solar-king-huang-ming-look-basics-first> (last accessed 4/13/2012)
- “China’s Thirst for Oil”. 2008. *Crisis Group Asia* Report No 153 http://www.crisisgroup.org/~media/Files/asia/north-east-asia/153_china_s_thirst_for_oil.ashx (last accessed 4/13/2012)
- “China’s Twelfth Five Year Plan (2011-2015)- the Full English Version.” 2012, May 11. Prepared by the Delegation of the European Union of China, accessed via *China Direct*. http://cbi.typepad.com/china_direct/2011/05/chinas-twelfth-five-new-plan-the-full-english-version.html (last accessed 4/13/2012)
- “China World’s Top Energy Consumer”. 2011, June 8. *CBC News* <http://www.cbc.ca/news/business/story/2011/06/08/china-energy-consumption.html> (last accessed 4/13/2012)
- Chou, B.K.P. 2009. “Government and Policy-Making Reform in China: The implications of governing capacity” *Comparative Development and Policy in Asia*. Routledge, NY
- Chovanec, P. 2012, March 15. “Bo’s Ides of March” *An American Perspective from China* (Personal Blog). <http://chovanec.wordpress.com/2012/03/15/bos-ides-of-march/> (last accessed 4/13/2012)
- Chow, G.C. 1988. “Market Socialism and Economic Development in China”. Economic Research Program Research Memorandum no. 340. *Princeton University*
- “Clean Energy: An Exporter’s Guide to China” 2008. *Energy and Security Group*. For U.S. Department of Commerce, International Trade Administration.
- Deng, G. & Kennedy, S. 2010. “Big Business and Industry Association Lobbying in China: The Paradox of Contrasting Styles”. *The China Journal* No. 63
- Deng, Y., Morck, R., Jing, W. & Young, B. (2011) “Monetary and Fiscal Stimuli, Ownership Structure, and China’s Housing Market”. *NBER Working Paper Series*. No. Working Paper 16871. Cambridge, MA: National Bureau of Economic Research.
- Downs, E.S. 2008a. “China’s Energy Policies and Their Environmental Impacts” *Brookings Institution*. http://www.brookings.edu/testimony/2008/0813_china_downs.aspx (last accessed 4/13/2012)
- Downs, E.S. 2008b. “China’s “New” Energy Administration”. *China Business Review.Com* (November-December 2008), p. 42-45
- Downs, E.S. 2012. “China—Gulf Energy Relations” *Brookings Institution*. http://www.brookings.edu/articles/2011/0801_china_gulf_energy_downs.aspx (last accessed 4/13/2012)
- Du, J. 2012. “China Sets Up First Renewable-energy Think Tank” *ChinaDaily.com* http://www.chinadaily.com.cn/bizchina/2012-02/24/content_14686084.htm (last accessed 4/13/2012)

- “Energy Efficiency is Not Just Low-hanging Fruit; it is Fruit that is Lying on the Ground” 2009, May 27. *The New Scientist*. Magazine Issue 2710.
<http://www.newscientist.com/article/mg20227103.700-energy-efficiency-is-not-just-lowhanging-fruit-it-is-fruit-that-is-lying-on-the-ground.html> (last accessed 4/13/2012)
- Gallagher, M. 2011. “Communist Party Rule, Bureaucracy and Policy Implementation” Political Science 339, Lecture 14. Slide 18. Winter 2011. The University of Michigan [Transcript]
- “Government Structure” China. 2012 *University of Florida*.
http://secondchina.com/Learning_Modules/GOV/content/GOV_standing_commitee.html (last accessed 4/13/2012)
- “Guidance Notes” *China Clean Energy Database (Db)*.
<http://www.chinacleanenergydb.com/Guidance-Notes> (last accessed 4/13/2012)
- Han, J., Mol, A.P.J. & Lu, Y. 2010. “Solar Water Heaters in China: A New Day Dawning” *Energy Policy* Vol. 38 p. 383-391
- Heggelund, G. 2005. 'Running into Dead Ends: Challenges in Researching the Three Gorges Dam'. *China Environment Series*, Woodrow Wilson International Center for Scholars, Vol. 7, p. 79-83.
- Heggelund, Gørild. 2004. “*Environmental and Resettlement Politics in China: The Three Gorges Project*” Ashgate Publishing Limited, Hants, England.
- Himin. Company Website. <http://www.himinsun.com/> (last accessed 4/13/2012)
- Hong, Q. 2010. “China’s New National Energy Commission”. *China Brief*.
<http://www.bmchina.com.cn/EN/perspectives/Documents/China%27s%20New%20National%20Energy%20Commission-%20Qu%20Hong.pdf> (last accessed 4/13/2012)
- Huang, H. & Zheng, Y. 2009. “Present Situation and Future Prospect of Hydropower in China.” *Renewable and Sustainable Energy Reviews* Vol.13 p.1652-1656
- “Hu Jintao’s Speech on Climate Change”. 2009, September 22. *The New York Times*.
http://www.nytimes.com/2009/09/23/world/asia/23hu.text.html?_r=2 (last accessed 4/13/2012)
- International Rivers. “Going Overseas”. <http://www.internationalrivers.org/node/6384>
- Kasey, J. & Koleski, K. 2011. “Backgrounder: China’s 12th Five-Year Plan” *US-China Economic & Security Review Commission*
- Kennedy, S. 2012. “Comparing Formal and Informal Lobbying Practices in China: The Capital’s Ambivalent Embrace of Capitalists” *China Information*. 23 p.195
- Knight, E. 2011, June. “The Sun King: Shi Zengrong” *The Monthly*.
<http://www.themonthly.com.au/shi-zhengrong-sun-king-eric-knight-3363> (last accessed 4/13/2012)

- Kong, B. 2006. "Institutional Insecurity" *Oil, Gas & Energy Intelligence*, Vol. 6, Issue 1, p. 64-88
- Jing, Y. 2011. "China's Energy Consumption and Sustainable Development: Comparative Evidence from GDP and Genuine Savings" *Renewable and Sustainable Energy Reviews* Vol. 15 p.2984-2989
- Lardy, N.R. 2001 May 9. "Issues in China's WTO Accession". *Brookings Institution*.
http://www.brookings.edu/testimony/2001/0509foreignpolicy_lardy.aspx
 (last accessed 4/13/2012)
- Lewis, S.W. 2011. "Carbon Management in China: The Effects of Decentralization and Privatization" *Energyforum*. James A. Baker III Institute for Public Policy, Rice University.
- Li, C. 2009a, March 1. "China's Team of Rivals" *Foreign Policy*.
http://www.foreignpolicy.com/articles/2009/02/16/china_s_team_of_rivals
 (last accessed 4/13/2012)
- Li, C. 2009b, August 16. "One Party, Two Coalitions in China's Politics". East Asia Forum.
http://www.brookings.edu/opinions/2009/0816_china_li.aspx (last accessed 4/13/2012)
- Li, C. 2012. "The Battle for China's Top Nine Leadership Posts" *The Washington Quarterly* Vol. 35(1) p.131-145
- Li, J. & Ma, L. (Lead Contributors) 2009. "Background Paper: Chinese Renewables Status Report". *REN21*.
- Li, J. 2005. "Solar Thermal in China: Overview and Perspectives of the Chinese Solar Thermal Market." *Refocus* Vol. 6(5) p. 25-27
- Li, J. 2011. "China Registers Sharp Drop in Carbon Intensity" *ChinaDaily.com*
http://www.chinadaily.com.cn/cndy/2011-11/10/content_14068558.htm (last accessed 4/13/2012)
- Li, W., S. G., Beresford, M. & Ma, B. 2011. "China's Transition to Green Energy Systems: The Economics of Home Solar Water Heaters and Their Popularization in Dezhou City". *Energy Policy*. Vol. 39 p. 5909-5919
- Lieberthal, K. & Oksenberg, M. 1986. "Bureaucratic Politics and Chinese Energy Development." Superintendent of Documents, U.S. Government Printing Office, Washington, DC.
- Lieberthal, K. & Oksenberg, M. 1988. "Policy Making in China Leaders, Structures, and Processes" Princeton University Press, Princeton, NJ.
- Lieberthal, K. 2004. "Governing China: From ReVol.ution Through Reform" W. W. Norton & Co. New York.
- Lin, L. & Milhaupt, C.J. 2011. "We are the (National) Champions: Understanding the Mechanisms of State Capitalism in China" *Working Paper* No. 49. Columbia University School of Law.

- Ma, H. 2011, February 7. "Practical Steps for Developing Renewable Energy in China's 12th Five-Year Plan" *ReVolt: The Worldwatch Institute's Climate and Energy Blog*. Accessed from <http://blogs.worldwatch.org/reVol.t/practical-steps-for-developing-renewable-energy-in-china%E2%80%99s-12th-five-year-plan/> (last accessed 4/13/2012)
- Ma, H., Oxley, L. & Gibson, J. 2009. "China's energy situation in the new millennium" *Renewable and Sustainable Energy Reviews* Vol. 13(8) p.1781-1799
- Ma, W. & Kowsmann, P. 2011, Dec 23. "China Gets Stake In Portugal's EDP" *The Wall Street Journal*. <http://online.wsj.com/article/SB10001424052970204464404577114471370252452.html> (last accessed 4/13/2012)
- MacLeod, C. 2012, April 11. "Bo Xilai Stripped of Power; Wife Accused in Murder". *USA Today*. <http://www.usatoday.com/news/world/story/2012-04-10/communist-leader-bo-xilai-murder/54159062/1> (last accessed 4/14/2012)
- Magee, D. 2006. "Powershed Politics: Yunnan Hydropower under Great Western Development" *The China Quarterly* . Vol. 185 p. 23-41
- Martin, M.F. 2010. "Understanding China's Political System". *Congressional Research Service*. R41007
- Martinot, E. & Li, J. 2007. "Powering China's Development. The Role of Renewable Energy" *Worldwatch Report* Vol.175
- Mastny, L. (Ed.). 2010. "Renewable Energy and Energy Efficiency in China: Current Status and Prospects for 2020" *Worldwatch Report 182*. Worldwatch Institute and Renewable Energy & Energy Efficiency Partnership.
- McNally, A., Magee, D. & Wolf, A.T. 2009. "Hydropower and Sustainability: Resilience and Vulnerability in China's Powersheds". *Journal of Environmental Management*. Vol. 90 p.286-293
- "Medium and Long-Term Development Plan for Renewable Energy in China (Abbreviated Version, English Draft)" 2007. *National Development and Reform Commission (NDRC), People's Republic of China*. Accessed from <http://www.chinaenvironmentallaw.com/wp-content/uploads/2008/04/medium-and-long-term-development-plan-for-renewable-energy.pdf> (last accessed 4/13/2012)
- Miller, A. 2008. "The CCP Central Committee's Leading Small Groups". *China Leadership Monitor*, No. 26, Fall.
- Moore, M. 2012, March 15. "Top Chinese Leader Bo Xilai Purged, One Day after Criticism" *The Telegraph* <http://www.telegraph.co.uk/news/worldnews/asia/china/9144860/Top-Chinese-leader-Bo-Xilai-purged-one-day-after-criticism.html> (last accessed 4/13/2012)
- Morelli, M. 2009, October 9. "Energy Secretary Steven Chu, in Syracuse, Delivers \$1.44 Million Energy Efficiency Grant to City" *Syracuse.com*

http://www.syracuse.com/news/index.ssf/2009/10/energy_secretary_steven_chu_in.html (last accessed 4/13/2012)

Nagel, S. S. (Ed.). 2000. *Handbook of Global Political Policy*. CRC Press.

National Bureau of Statistics of China, 2010 China Statistical Yearbook. *2010 China Statistics Press*.

Oster, S. 2007, December 28. "China: New Dam Builder for the World" *The Wall Street Journal*. <http://online.wsj.com/article/SB119880902773554655.html> (last accessed 4/13/2012)

Patton, D. 2012, February 27. "China Launches National Renewable Energy Think-Tank" *Recharge News*. http://www.rechargenews.com/business_area/politics/article304819.ece (last accessed 4/13/2012)

Personal communications, Anonymous Staff from China Data Center, January 13, 2012.

Qian, Gang. 2011. Director, China Media Project, Hong Kong University. Panelist in *FutureChina Global Forum*, "China in the Next Phase: Marching to a New Drumbeat". 12 July 2011, Singapore.

Qiu, X. & Li, H. 2009 "China's Environmental Super Ministry Reform: Background, Challenges, and the Future." *Environmental Law Reporter* Vol. 39 p. 10152-10163

Ralston, D.A., Terpstra-Tong, J., Terpstra, R.H., Wang, X. & Egri, C. 2006. Today's state-owned enterprises of China: Are they dying dinosaurs or dynamic dynamos? *Strategic Management Journal*, 27(9) p.825-843.

"Recommendations for Improving the Effectiveness of Renewable Energy Policies in China" 2009. *REN21 Secretariat*. For Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH & United Nations Environment Programme

RELaw Assist. Renewable Energy Law in China- Issues Paper. 2007. *Baker & McKenzie, Renewable Energy Generators of Australia, Chinese Renewable Energy Industry Association, Center*. For Renewable Energy Development

"Renewable Energy in China. Renewable Energy Policy in China: Overview" 2004. National Renewable Energy Laboratory, operating for the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy.

"The Renewable Energy Law of the People's Republic of China." 2009. *The National People's Congress of the People's Republic of China*. http://www.npc.gov.cn/englishnpc/Special/CombatingClimateChange/2009-08/25/content_1515301.htm (last accessed 4/13/2012)

Roberts, D. 2012a, April 10. "Bo Xilai's Fall Complicates China's Leadership Transition". *Bloomberg Businessweek*. <http://www.businessweek.com/articles/2012-04-10/bo-xilais-fall-complicates-chinas-leadership-transition> (last accessed 4/13/2012)

- Roberts, D. 2012b, March 15. "Political Shocker has Implications for the Economy" *Bloomberg Businessweek* <http://www.businessweek.com/articles/2012-03-15/a-political-shocker-in-china-has-implications-for-the-economy> (last accessed 4/13/2012)
- Rodrigue, J., Comtois C. & Slack, B. 2009. *The Geography of Transport Systems*. Chapter 9. "The Policy Process". Routledge. <http://people.hofstra.edu/geotrans/eng/ch9en/conc9en/ch9c2en.html> (last accessed 4/13/2012)
- Rogers, S. & Evans, L. 2011. "World Carbon Dioxide Emissions Data by Country: China Speeds Ahead of the Rest" (no date). *Datablog*. <http://www.guardian.co.uk/news/datablog/2011/jan/31/world-carbon-dioxide-emissions-country-data-co2> (last accessed 4/13/2012)
- Saich, T. "*Governance and Politics of China*" Palgrave Macmillan, New York, NY.
- "Satisfy the people" 2012. *The Economist*. Volume 402 Number 8775
- Sheridan, K. 2012, April 11. "US Grabs Lead Over China in Clean Energy Race" *AFP*. <http://news.yahoo.com/us-grabs-lead-over-china-clean-energy-race-231942326.html> (last accessed 4/13/2012)
- "Shoddy Solar Water Heaters Threaten Industry Reputation: Association Leader". 2011, February 24. *Xinhua News*. http://news.xinhuanet.com/english2010/china/2011-02/24/c_13748403.htm (last accessed 4/13/2012)
- Snieckus, D. 2012, March 13. "Suntech Claims Record Efficiency for Pluto Cell Technology" *Recharge News*. <http://www.rechargenews.com/energy/solar/article307226.ece> (last accessed 4/13/2012)
- "State Energy Leading Group Office Formally Set Up" 2005, June 3. *People.com.cn* http://english.peopledaily.com.cn/200506/03/eng20050603_188369.html (last accessed 4/13/2012)
- Streets D.G. & Walfhoff, S.T. 2000. "Present and Future Emissions of Air Pollutants in China: SO₂, NO_x and CO" *Atmospheric Environment* Vol. 34 p. 363-374 (last accessed 4/13/2012)
- Swartz, S. & Oster, S. 2010, July 18. "China Tops U.S. in Energy Use. Asian Giant Emerges as No.1 Consumer of Power, Reshaping Oil Markets, Diplomacy" *The Wall Street Journal* <http://online.wsj.com/article/SB10001424052748703720504575376712353150310.html> (last accessed 4/13/2012)
- Szamoszegi, A & Kyle, C. 2011. "An Analysis of State-owned Enterprises and State Capitalism in China". *U.S.-China Economic and Security Review Commission*. Capital Trade, Incorporated
- Taylor, A. & Li, Z. 1996. "Geothermal Resources in China" *Bob Lawrence and Associates, Inc.* Alexandria, Virginia. Online Resource. <http://www.bla.com/ECB/PDFFiles/China1996.PDF> (last accessed 4/6/2012)

- Tucker, N. 2007, November 4. "How China Rises" *21st Century Socialism*
http://21stcenturysocialism.com/article/how_china_rises_01546.html (last accessed 4/6/2012)
- Wang, R.Z. & Zhai, X.Q. 2010. "Development of Solar Thermal Technologies in China" *Energy* Vol. 35 p4407-4416
- Wang, Y. 2003. "*China's Economic Development and Democratization*" Ashgate Publishing Limited.
- Wood, L. 2012, March 1. "Research and Markets: China Solar Water Heater Industry Report, 2011" *Business Wire* <http://finance.yahoo.com/news/research-markets-china-solar-water-111400661.html> (last accessed 4/13/2012)
- "Who's Winning the Clean Energy Race" 2010. *The Pew Charitable Trust*
- Yaffee, S. 2011. Lecture Notes. Natural Resources and Environment 562, Lecture 3. Winter 2011. The University of Michigan, MI.
- Yang, D.L. 1991. "China Adjusts to the World Economy: The Political Economy of China's Coastal Development Strategy" *Pacific Affairs* 64(1) p. 42-64 (last accessed 4/13/2012)
- Yang, X. 2008, March 10. "SEPA Gets Stronger" *China.org.cn*
http://www.china.org.cn/environment/news/2008-03/10/content_12143406.htm (last accessed 4/13/2012)
- Yang, Y. 2011. "Feasible Paths of Development for Think Tanks in China" *Briefing Paper*, Special Issue. p. 25-33
- "Zhang Dejiang Replaces Bo Xilai as Chongqing Party Chief." 2012, March 15. *Chinese Government's Official Web Portal*. http://english.gov.cn/2012-03/15/content_2092331.htm (last accessed 4/13/2012)
- Zhang, J.; Deng, S., Fei, S. Yang, X., Liu, G., ... Wang, Y. 2011 "Modeling the relationship between energy consumption and economy development in China" *Energy* Vol. 36 p. 4227-4234
- Zhang, L & Lee, J. 2008 "Situation Report: Energy Policy." *China Security*. Issue 11
http://www.chinasecurity.us/index.php?option=com_content&view=article&id=61&Itemid=8 (last accessed 4/13/2012)
- Zhao et al. 2011. "A Critical Analysis of the PhotoVoltaic Power Industry in China—From Diamond Model to Gear Model" *Renewable and Sustainable Energy Review* Vol. 15 p. 4963-4971
- Zhu, X. & Xue, L. 2007. "Think Tanks in Transitional China". *Public Administration and Development*. Vol. 27 p. 452-464.
- Zhu, X. 2011. "Government Advisors or Public Advocates? Roles of Think Tanks in China from the Perspective of Regional Variations" *The China Quarterly* 207 p. 668-686