

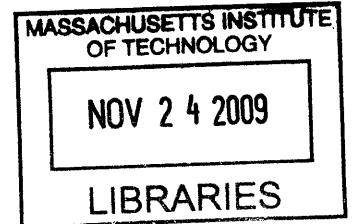
**A Portfolio Approach to Energy Governance:  
State Management of  
China's Coal and Electric Power Supply Industries**

by

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Submitted to the Department of Political Science on July 28, 2009 in partial fulfillment of  
the requirements for the degree of  
Doctor of Philosophy in Political Science

*Abstract*

This study addresses the extent to which China's central state devolved ownership and investment levels in its energy sector to other actors during the modern reform period (1978-2008). The project focused on China's coal and electric power industries, leveraging industry and government data, interviews, two firm case studies and a unique survey to measure policy, ownership and investment change over time. The results show that such devolution has been neither incrementally advancing nor consistently lacking, but has fluctuated according to the national electric power balance. The study suggests that China's central state actively manages the range of firms in the strategic coal and electric power industries as a dynamic portfolio of assets, resulting in such fluctuation.

These findings run counter to what the dominant theories in the literature would otherwise predict. Neo-liberal theory would predict the incremental reduction of central state ownership in these sectors, as is evident in many of China's other sectors. Arguments predicated on the ability of the central state to sustain "self-reproducing authoritarianism" would predict fairly stable levels of central state investment and ownership in this strategic sector through time as well as quite limited liberalization. Finally, a theory privileging elite politics would indeed predict fluctuations, yet at different turning points in time than those found in this study, and without the sustained pattern that is evident in the extended time period under examination, which spans four distinct political eras.

This first implication of this study is that neo-liberal means can be deployed to achieve stated ends. Second, the study provides evidence that such means of economic liberalization reform need not be cumulative and are, in fact, reversible. Third, the case studies reveal that firm decisions have a significant impact on the execution of these powerful broad central state policy changes that periodically reshape the structure of China's energy sector. Finally, this study also raises important implications relating to public policy, and in particular the ability of the Chinese state to fulfill aggressive greenhouse gas emission reductions in an effort to mitigate climate change.

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## *TABLE OF CONTENTS*

<u>Acknowledgements</u>	7
<u>Chapter One:</u> Liberalization as a Means: A Portfolio Approach to Energy Supply	10
<u>Chapter Two:</u> Economic Growth and Industrial Organization: The State in China’s Coal and Electric Power Industries	57
<u>Chapter Three:</u> Case One – The Jinyuan Group: A Local Firm’s Persistence	119
<u>Chapter Four:</u> Case Two – The Luneng Group: A Local Firm’s Nationalization	165
<u>Chapter Five:</u> Implications for Theory and Policy	197
<u>Appendices</u>	222
<u>Select Bibliography</u>	226



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My other committee members also balanced demanding standards and nurturing support. Learning from Suzanne Berger was, and continues to be, one of the rarest of privileges. Her intellect is exceeded only by the depth of her compassion for, and dedication to, her students. Tony Saich exposed me first professionally, and then intellectually, to a set of individuals and ideas in China of which I previously had only a vague notion. He is the most generous scholar I have encountered, and repeatedly shared his considerable resources. The case studies in particular would not have been possible without his support. Richard Lester, kindly and patiently, taught me much about energy technology, energy policy, energy markets, and their regulation. He is a unique scholar who is able to span the considerable chasm that too often separates the physical and social sciences, and does so with such good humor and academic rigor. I look forward to continuing the intellectual dialogue with my committee members that this dissertation has created.

The bulk of data and interviews for this study were attainable only through the generosity of a diverse set of friends and colleagues throughout China's academic, government and industry sectors. I owe these individuals an enormous debt of gratitude for opening their doors to me and for guiding me patiently through the dense labyrinth of their country's energy sector.

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Management at Tsinghua University, MIT Center for International Studies, MIT Energy Initiative, MIT Industrial Performance Center, Asia Programs at the Harvard Kennedy School, and MIT Department of Political Science for providing financial and institutional support. Susan Twarog, Anita Kafka, Paula Kreutzer, Diana Gallagher, Monica Wolf, Helen Ray and Kate Searle always greeted my myriad questions with a smile.

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## CHAPTER ONE

### Liberalization as a Means: A Portfolio Approach to Energy Supply

#### *The Outcome and the Argument in Brief*

*"[I]nstability is not the result of poor management or other inadequacies. Nor is it the expression of external dependency. It is rather at the heart of politics: creating and maintaining conditions for the exercise of power...It leads actors in the private sector to 'insure themselves' by strengthening networks (which are a mix of public and private actors), multiplying contacts and relations with the public sector...The lack of a precise boundary between what is punished and what is allowed, between what is authorized, tolerated, and condemned, between licit and illicit, and the games surrounding conflicts of principles – all this creates the space for political intervention...and also leads to permanent negotiations among actors."*<sup>1</sup>

#### *The Outcome – Fluctuating Industry Structure*

Powerful international trends of economic liberalization in the past three decades have restructured a spectrum of sectors, ranging from basic manufacturing to energy supply. Governments have instituted reforms that have lowered barriers to entry for ownership and investment, driving rapid economic growth in a similarly rich variety of national institutional environments, particularly in the developing world. Osborne and Gaebler best captured the dominant normative approach to the relationship between this economic diversification process and the function of government, arguing that an effective state must learn to stop "rowing" the economy by direct means of ownership and start "steering" it through indirect means of regulation.<sup>2</sup> The currency of such policy prescription has transformed economic liberalization into a policy "end", rather than a policy "means". As a result, liberalization is often framed as a goal of reform, rather than one of many tools of development available to the state.

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<sup>1</sup> Beatrice Hibou, "From privatizing the economy to privatizing the state" in Beatrice Hibou (ed.), *Privatizing the state* (New York: Columbia University Press, 2004), p.16.

<sup>2</sup> David Osborne and Ted Gaebler. *Reinventing government: How the entrepreneurial spirit is transforming the public sector.* (Reading, MA: Addison-Wesley 1992).

China has been widely cited as one of the world's grandest examples of the benefits of economic liberalization.<sup>3</sup> The loosening of government restrictions on economic transactions and forms of asset ownership, the delegation of control or decision-making rights from the state to firms, the introduction of more flexible pricing according to scarcity, increasingly unencumbered trade between firms, and other policies are all forms of liberalization rightly credited as guiding China's economic boom of the past three decades. This historic economic growth has been fueled by equally historic growth, much less studied, in energy production.

While some scholars have argued that economic liberalization policies have spread to include China's energy sector, others suggest that this sector's more strategic nature has required high degrees of state dominance. The evidence presented in this dissertation fits neither description. The ownership and investment structure of China's coal and electric power industries over time does not reveal a pattern of incremental and cumulative liberalization, as neo-liberal theory would otherwise predict. Ownership and industry structure does not provide evidence of consistent, direct central state dominance either, as variants of developmental state theory and arguments citing China's self-reproducing authoritarianism would otherwise predict. Rather, central state ownership and investment growth in these critical industries has fluctuated. During some periods central state ownership is consolidated and during others such ownership is diluted to include private and public capital from domestic and foreign sources. This fluctuation is

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<sup>3</sup> See for example Scott Rozelle, Albert Park, Jing Huang and Hui Jin, "Liberalization and rural market integration in China," *American Journal of Agricultural Economics* (1997): 635–642; Jeffrey Sachs and Wing-Thye Woo, "Understanding China's economic performance," *Journal of Economic Policy Reform* 4, no. 1 (2000): 1–50; and Lawrence Lau, Yingyi Qian, and Gerard Roland, "Reform without losers: An interpretation of China's dual-track approach to transition," *Journal of Political Economy* 108, no. 1 (2000): 120–143. Policies of economic liberalization are distinct from policies related to outright privatization. For a useful discussion of such distinction see: Sujian Guo, "The ownership reform in China: what direction and how far?," *Journal of Contemporary China* 12, no. 36 (2003), p.562.

driven by active central state management of these industries according to patterns of national electric power balance (shortage vs. surplus). China's case illustrates that economic liberalization that divests and diversifies energy ownership and investment to include foreign, local non-state and local state firms can be reversed, and reversed in predictable patterns.

#### *The Argument – A Portfolio Approach to Industrial Organization*

This dissertation focuses on state actors and firms. The study suggests that China's central state treats the range of firms in the strategic coal and electric power industries as a dynamic portfolio of assets to be managed actively by the state, resulting in fluctuating growth rates of state ownership and investment over time. The interventionist tools of what has been termed state-led "late development" (or the "developmental state" in more recent years) are often framed in opposition to the state-reducing and market-enabling tools of neo-liberal development models. This dissertation argues that these are not necessarily separate models of development, but rather collections of tools on a policy continuum that remain available to the state over time. The study's findings show that neo-liberal means can be deployed to achieve state-led ends and that liberalization, therefore, need not be cumulative and continuous but rather can be reversed under certain circumstances.

#### *Structural Risks, Ideational Frames, and Functionalist Policies*

The creation and expansion of a national energy system presents governments with inherent risks that must be managed if an economy is to be supplied with the energy it requires to grow. Some risks are structural, and inherent to the sector itself. Energy systems are characterized by high levels of capital intensity (e.g. oil refining), long-cycle

investments with extended pay-back periods (e.g. oil exploration and production), natural monopolies (e.g. electric grid transmission), and high levels of risk that result from the combination of these attributes. Energy flows may also carry the added complexity of perceived national security externalities, such as supply risk in the form of oil import dependency on one partner. These structural aspects of the sector create certain functional needs of large-scale capital agglomeration, long-term management of short-term demand cycles and longer-term investment supply cycles, the creation and enforcement of safety standards, the oversight of transmission and dispatch, and other others. The role of the state in such an industry is therefore of critical concern, both in theoretical and empirical terms, and the range of possible policies available is shaped by these functional needs.<sup>4</sup>

While all states must mitigate such complex sources of risk, their approaches for managing this risk differ markedly. On one side of the spectrum, the US federal government has shifted much of the capital risk and investment cycle risk to private firms, long prominent in its national energy sector, and much of the regulatory risk (environmental, labor, etc.) has been ceded to state-level governments.<sup>5</sup> These private firms have therefore increasingly become involved in informing the local and federal regulatory process, creating issues of market power and corporate malfeasance that led in large measure to the investigation and collapse of firms such as the Enron Corporation. Other variants of this “neo-liberal” organization of the sector include England and Wales,

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<sup>4</sup> For a useful examination of the role of government in energy markets, please see C. D. Foster, *Privatization, public ownership, and the regulation of natural monopoly* (Oxford: Blackwell Publishers, 1992).

<sup>5</sup> See for example Robert Hirsh, *Power loss: the origins of deregulation and restructuring in the American electric utility system* (Cambridge: MIT Press, 1999).

in which strong labor unions and state monopolies in upstream energy supply industries were dismantled by the British state to strengthen competition.<sup>6</sup> As in the US, investment cycle risk and capital risk in England and Wales are borne by private firms, with some exceptions of public ownership, such as the nuclear industry. Foreign firms were encouraged to invest, with major waves of US capital inflow following the privatization of the late 1980s. In comparison with the US, regulatory risk is concentrated more at the level of the central state, resulting in a more active regulatory presence ensuring competition.<sup>7</sup>

Towards the other side of the spectrum, France has attempted to inject aspects of competitive pressures and incentives through private ownership in some industries of its national energy system while maintaining much of the investment cycle, capital and regulatory risk in the hands of the central state in other industries.<sup>8</sup> The French state retains 85 percent ownership of the firm Electricite de France (EdF), the nation's effective monopoly electricity supplier, yet only 5 percent of Total, S.A., France's "supermajor" oil firm. Industry and state interests relate through corporatist representation on firm governance boards. In sum, common risks inherent in energy provision are constantly faced by all states and require functional responses to serve clear needs, yet their responses of how best to organize industry and policy to manage such risks are diverse. This diversity emerges from both ideational frames that shape the

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<sup>6</sup> See for example Carles Boix, "Privatizing the Public Business Sector in the Eighties: Economic Performance, Partisan Responses and Divided Governments", *British Journal of Political Science* 27 (1997): 473-96.

<sup>7</sup> See for example Maarten Arentsen and Rolf Kunneke, "Economic organization and liberalization of the electricity industry: In search of conceptualization", *Energy Policy* 24, no. 6 (1996), pp. 541-552.

<sup>8</sup> See for example: Dominique Finon, "French Energy Policy: The Effectiveness and Limitations of Colbertism", in *European Energy Policies in a Changing Environment*, Francis McGowan (ed.) 1996; Pepper Culpepper, "Capitalism, Coordination, and Economic Exchange: The French Political Economy since 1985," in *Changing France: The Politics That Markets Make*, Peter Hall and Bruno Palier (ed.) 2006.

assessment of risk and also functional responses that shape the range of policies to manage such risk.

As this study suggests, the organization of China's energy sector is also distinct, and serves as another node on this international spectrum. Growth rates of Chinese central state ownership and investment in coal and electric power generation industries over the past 30 years have not declined, and therefore not mirrored patterns of the neo-liberal model, variants of which are found in the US and the UK. China's energy development has also not mirrored patterns of the more corporatist model of France. China's central state has not maintained a monopoly in these areas either. Understanding the timing and pattern of the fluctuation that is evident in ownership and investment levels requires understanding the functional needs of the energy sector and the ideational forces that influence the scope and execution of China's portfolio approach to energy management.

Functionalist analysis is useful in understanding the range of policy options available to the Chinese state in ensuring energy supply, and in particular why that range includes the state's active support of firms other than those owned by the central state. Major changes in China's economic growth rate affect the capacity of central state-owned firms to deliver adequate coal and electric power supply, and therefore affect the policies adopted by central state actors. Assuming that the central state maintains higher economic growth as a priority, high rates of annual economic growth (usually above nine percent) strain existing limited central state-owned energy production capacity and create a functional need for the state to identify and support alternative means to increase supply. Under such circumstances, the central state elects to diversify ownership and

investment, thus expanding the portfolio of types of firms participating in coal and electric power provision.

However, even when there have been significant economic liberalization reforms in coal and electric power industries, the ownership and investment share of these critical local state-owned, private, and public/private hybrid firms have not cumulatively superseded central state-owned firms. Instead, periods of lower growth and resulting energy surplus provide the opportunity for the central state to reassess industry structure and to re-exert control. Were the state's portfolio approach strictly functionalist, the often less-efficient central state-owned firms in coal and electric power generation would be shuttered during periods of energy surplus, as their output is no longer needed and less able to fulfill demand efficiently. In fact, the central state often uses such periods to remove local- and foreign-owned competitors from the market. Some of these firms are shuttered while others are allowed to be acquired by eager central SOE incumbents. These periods of lower growth remove the pressures of short energy supply, and ideological concerns over ownership in this critical industry regain political force. The central state accomplishes such change through the exercise of, primarily, levers of market access, contract price parameters, and personnel management that remain under the authority of a stable set of central state entities. China's coal and electric power industries are actively managed portfolios of firms, not the self-regulating systems of market actors as strict functionalism would suggest.

The structure of China's coal and electric power industries provides a useful roadmap for following the fluctuations of policy and the state's portfolio approach. The two case studies illustrate the mechanisms through which such policies are negotiated

between central state, local (largely provincial) state, and firm. In periods of high economic growth, neo-liberal policies of loosening prices and diversifying ownership can be pursued by the central state to achieve goals of “late development”, such as rapid capital agglomeration and industrialization, only to be curtailed in periods of lower growth. China’s case illustrates how use of such neo-liberal policies does not preclude the state from reasserting traditional interventionist catch-up policies later in the development process (*e.g.* consolidation or nationalization), despite the presence on the terrain of powerful firms and local state interests created in the process of reform. China’s central state has proven quite successful in allowing periodic reductions in state ownership, pricing authority, and monopoly producer rights to ensure the growth of what is arguably the most politically critical sector of the economy. It has also proven quite successful at reasserting its claims on assets after these private, local state, and foreign investment surge during periods of liberalization.

### *The State of the Literature*

#### *Three Primary Approaches*

Scholars have sought to explain the evolution of national energy sectors through a variety of frameworks relating to the political economy of reform. Three are of primary importance to this study. The first approach views change in the energy industry as a story of linear global economic liberalization. As two leading analysts write: “Since the initiation of reform in 1978, three major themes in China’s energy sector have been decentralization, the shift to liberalized markets, and internationalization”.<sup>9</sup> According to this view, major early neo-liberal experiments in the governance of the US, UK and

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<sup>9</sup> Nathaniel Aden and Jonathan Sinton, “Environmental implications of energy policy in China,” *Environmental Politics* 15, no. 2 (2006), p. 268.

Chilean energy systems of the 1980s migrated east to influence the energy policies of the developing world by the early 1990s. This neo-liberal approach suggests that China was not immune to this trend and major changes in the portfolio of firms and state functions in China's energy sector reflect a fairly linear, delayed evolution of liberalization in step with these global shifts.<sup>10</sup>

China scholars have also attempted to explain this larger process of economic evolution and have adopted a variant of this global story, tailored more to China's transitional economy conditions. This China-specific interpretation views the central state as pursuing an incremental liberalization reform agenda that began on the periphery of the Chinese economy (agriculture) and gradually spread through halting steps to core sectors such as energy. Critical to this story is the assumption that such reforms added economic capacity through the nurturing of peripheral actors that were able to strengthen and eventually to supersede the state-owned economy in agriculture, manufacturing, and increasingly energy.<sup>11</sup> China's energy sector is therefore liberalizing late, but still on a gradual evolutionary path of "growing out of the plan".

The second broad approach views changes in China's energy sector as examples of a developmental or neo-developmental state that is maintaining variations on a theme of self-reproducing authoritarianism. Energy is a critical part of the "commanding heights" of any economy and therefore considered too important to the state to allow the

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<sup>10</sup> Carlos Rufin, *The Political Economy of Institutional Change in the Electricity Supply Industry* (Cheltenham: Edward Elgar Publishing, 2003); James Williams and Navroz Dubash, "Asian electricity reform in historical perspective," *Pacific Affairs* (2004). See also Stephan Haggard and Richard Kaufman, *The Politics of Economic Adjustment: International Constraints, Distributive Conflicts, and the State* (Princeton: Princeton University Press, 1992) and John Williamson, *The Political Economy of Policy Reform* (Washington: Institute for International Economics, 1994).

<sup>11</sup> One of the most convincing versions of this approach has been Barry Naughton, *Growing out of the Plan: Chinese Economic Reform, 1978-1993* (Cambridge: Cambridge University Press, 1995). For a recent counter-argument see Yasheng Huang, *Capitalism with Chinese characteristics: entrepreneurship and the state* (Cambridge: Cambridge University Press, 2008).

substantial introduction of market mechanisms and powerful non state-owned firms. As a result, the limited liberalization that has taken place in China's energy system has occurred under tightly constrained parameters set by the central government. The central government consistently seeks to assert its authority in the long-term and enters the sector in much the same manner as it has in the past. State ownership is actively supported and investment by firms, particularly abroad, is part of a long-term state-led strategy through central state-controlled enterprises.<sup>12</sup>

Empirically, at the industry level, the data regarding the fluctuation in shares of central state ownership and investment in China's coal and electric power industries collected in this study does not support the conclusions of the first approach advancing neo-liberal theories of incremental change. The central state clearly reasserts itself in these industries and becomes a direct player in the market, even after periods of economic liberalization. In addition, at the firm level, the two case studies analyzing the rise of locally-owned electric power firms chronicle the strong reassertion of the central state through full nationalization of one firm and the forced semi-merger of another. The evidence at the industry and firm level also refute the second theory of self-reproducing authoritarianism, which argues that a pluralization of actors and ownership has not occurred in this strategic sector. The existence and importance of periods of distinct economic liberalization and the empowerment of local and non-state corporate actors are clear.

A third approach to understanding change in China's energy sector is one based on

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<sup>12</sup> David Zweig and Bi Jianhai, "China's Global Hunt for Energy," *Foreign Affairs* vol. 84, no. 5 (2005). For a strong state argument relating to industrial reform, growth and state-connected firms see Yasheng Huang, *Selling China: Foreign Direct Investment During the Reform Era* (Cambridge: Cambridge University Press, 2003).

elite politics. This perspective does incorporate fluctuations in liberalization and retrenchment policies over time, and links such change to shifts in the primacy of competing elite political factions within the central government. According to this view, the timing of fluctuations in central state ownership and investment in China's energy sector is symptomatic of what some scholars term "political-business cycles" (PBCs). According to this view, leaders who are economically liberal oriented, once they are able to assume political authority, develop and promulgate policies of economic liberalization that work their way through the energy and other sectors. In contrast, once conservative leaders wrest political authority from such competitors, economic retrenchment policies are enforced.<sup>13</sup>

The portfolio argument forwarded in this study does not reject these theories in full. Instead, it recognizes the importance of economic liberalization policies in driving energy supply growth (as argued in neo-liberalism) as well as the implicit importance of the state's focus on ownership that informs the authoritarian approach. This study's argument provides a basic framework that explains under what circumstances these aspects of change most influence China's energy sector. For example, ideational frames are influential in this sector during periods of low growth, but become secondary to ensuring energy supply during high growth periods. This study does recognize the central importance of national leaders such as Deng Xiaoping, who shifted China's development goals after the Cultural Revolution. However, elite political shifts do not regularly result in the industry structure changes that are the focus of this study. Each of these three approaches are addressed below.

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<sup>13</sup> Richard Baum captures a variant of such a dynamic through his discussion of "fang/shou" cycles. See Richard Baum, *Burying Mao: Chinese politics in the age of Deng Xiaoping* (Princeton: Princeton University Press, 1994).

### *Creeping Liberalization*

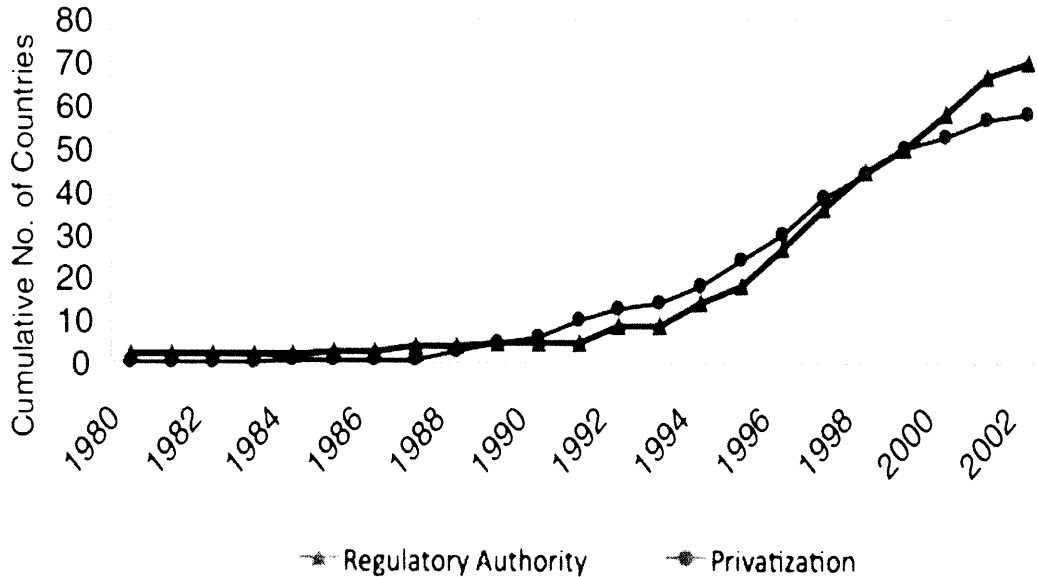
The first argument views change in the energy industry as a story of a global “creeping liberalization” that reduces the scope of direct state intervention in the market.<sup>14</sup> Scholars analyzing the evolution of state intervention focus primarily on the creation and independence of the formal regulator or expert commission. Change over time is traditionally explained largely in linear, normative terms, marked by progress towards competitive markets, independent regulators, and the eventual removal of direct state involvement in the economy. Figure One illustrates the rapid international diffusion of neo-liberalism in electricity markets through the measure of two particular institutions: independent regulatory authorities and private property rights. As Carlos Rufin notes: “Far from being sheltered from such [liberalization] reform efforts because of high sunk investment and natural monopoly conditions, infrastructure sectors such as electricity...have constituted the core of the reform program; in fact, the ESI [electricity supply industry] has arguably been in many cases the ‘flagship’ showing the way for change”.<sup>15</sup>

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<sup>14</sup> For more recent examples of this argument in this context see: Tian Zhu, “China's Corporatization Drive: An Evaluation And Policy Implications,” *Contemporary Economic Policy* 17, no. 4 (1999): 530-9; David Levi-Faur, “The Global Diffusion of Regulatory Capitalism,” *The Annals of the American Academy of Political and Social Science* 598, no. 1 (March 1, 2005): 12-32; Covadonga Meseguer, “Policy Learning, Policy Diffusion, and the Making of a New Order,” *The Annals of the American Academy of Political and Social Science* 598, no. 1 (March 1, 2005): 67-82; Nancy Brune and Alexandra Guisinger, “Myth or Reality? The Diffusion of Financial Liberalization in Developing Countries”, Yale University MacMillan Center Working Paper (New Haven, Connecticut, Yale University, 2007).

<sup>15</sup> Carlos Rufin, *The political economy of institutional change in the electricity supply industry: shifting currents* (Edward Elgar Publishing, 2003), p.1.

**Figure 1. Diffusion of Regulatory Authorities and Privatization in Electricity Markets**



Source: David Levi-Faur, “The Global Diffusion of Regulatory Capitalism,” *The Annals of the American Academy of Political and Social Science* 598, no. 1 (March 1, 2005), p.18.

The idea of such liberal diffusion in the energy markets of the developing world was strengthened in the early 1990s through the demonstration effect provided by successful experiences of restructuring in developed economies such as England and Wales, Norway, and the US, but also success in developing economies such as Chile. The reform success of these nations provided considerable evidence that well-functioning and efficient energy markets at the minimum required several institutional reforms, including: the creation of independent regulatory authorities to replace direct state “owner and manager” control over assets; ownership reform through the commercialization and corporatization of assets into firms to facilitate privatization; and the pluralization of investment channels to include private and foreign actors.

A key mechanism of such diffusion in many developing economies was the conditional lending approach that the World Bank officially began to mandate beginning

in 1992; loans that were often vital to such economies because of “the inability of the state sector to finance needed expenditures on new investment”.<sup>16</sup> The World Bank’s support of ownership and regulatory reform, tied to many of the early loans particularly in the electric power generation industry in countries such as China, provided both incentive and some form of coercive and supervisory pressure to implement such policies. Margaret Pearson, in analyzing whether the rise of a “regulatory state” has indeed taken place in China, has highlighted how such neo-liberal principles influenced a variety of formal institutions within China’s central state, writing:

“The Chinese government has been made much aware of this [neo-liberal] model, in large part through its contacts with international organizations such as the World Bank, the OECD, the Asian Development Bank, and the World Trade Organization. In form, many of China’s reforms are consistent with, and informed by, key tenets of the global wave of regulatory reform: releasing some economic functions from direct government management; establishing regulators as market “referees”; and increasing the capacity and efficiency of the economic bureaucracy.”<sup>17</sup>

In fact, some recent scholarship analyzing China’s growth during the modern reform period suggests that the economic boom of the 1980s and early 1990s was even closer to neo-liberal ideals than previously believed. Yasheng Huang illustrates how China’s early growth in the rural areas exhibited what he terms “directional liberalism”, even in state-dominated sectors similar to energy, such as finance. He argues: “The successes of the Chinese economy are a function of *conventional* sources – private-sector development, financial liberalization, and property rights security.”<sup>18</sup> An important foundation of this argument is the assertion that the vast majority of Township and

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<sup>16</sup> RW Bacon and J. Besant-Jones, “Global electric power reform, privatization and liberalization of the electric power industry in developing countries”, *Annual Reviews: Energy & the Environment*, 26 (2001), p.1

<sup>17</sup> Margaret Pearson, “Regulation and Regulatory Politics in China’s Tiered Economy,” Draft paper prepared for conference on “Capitalism With Chinese Characteristics: China’s Political Economy in Comparative and Theoretical Perspectives, Indiana University, May 19-20, 2006, p.6-7.

<sup>18</sup> Huang (2008), p.30. Italics added.

Village Enterprises (TVEs) were in fact private firms and not public firms truly owned by local government. Huang points out that this category of firm was officially created in 1984 and such firms were defined as “enterprises sponsored by townships and villages, the alliance enterprises formed by peasants, other alliance enterprises and individual enterprises”.<sup>19</sup> Of the 12.5 million TVEs registered in 1985, 10.5 million were private, and by 1987 32 percent of the TVE sector’s gross output value was accounted for by private firms.<sup>20</sup> TVEs are a critical productive result of China’s economic liberalization and played a major role in the growth in China’s coal industry.

The rapid rise of TVEs in coal production and of foreign- and local state-owned firms in electric power production that fueled China’s energy boom highlight the importance of investment and ownership liberalization in China’s energy sector. As Huang argues, many of these firms are private or semi-private and were able to access investment and become legal entities through major reforms that lowered barriers to entry. According to official figures, TVEs (collective, private, and “other” mines) accounted for a mere 14 percent of total coal production in 1978 and rose to a dramatic 52 percent in 1996.<sup>21</sup> However, as Huang himself notes, it is striking that these dynamic local firms did not greatly reduce and supersede the share of central state-owned firms over the 25 years since that 1984 reform.<sup>22</sup> Had such reforms been allowed to continue, central state ownership of assets would necessarily have declined. However, in the case of the coal industry, the TVE share of production fell to 25 percent in 2001 and despite a resurgence to 44 percent by 2006, central state-owned firms still supplied more coal (48

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<sup>19</sup> Ibid., p.75.

<sup>20</sup> Ibid., p.80.

<sup>21</sup> Lawrence Berkeley National Laboratory (LBNL), China Energy Databook, 2008.

<sup>22</sup> Discussion with author, March 13, 2009.

percent). In electric power, while over 50 percent of installed capacity was produced by local state-owned, foreign and private firms, over 45 percent of capacity was still produced by central state-owned firms in 2007. Aspects of neo-liberalism were certainly at work in the energy production boom China has experienced, but the neo-liberal approach clearly does not explain the evolution of China's coal and electric power generation industry structures. The state continues to play a role and to determine outcomes in a way that is not captured by such a theory of development.

#### *Self-reproducing Authoritarianism*

The second approach views changes in China's energy sector as variations on a theme of "self-reproducing authoritarianism".<sup>23</sup> Unlike analyses of the private or quasi-private sector in China, which frequently frame state involvement as a largely "helping hand" model of development<sup>24</sup>, analysis of the energy sector often characterizes the central state as an interventionist actor pursuing regressive pricing and finance policies.<sup>25</sup> As discussed in Chapter Two, these perspectives see barriers to market entry for non-incumbent firms as high, incentives to support protectionism by incumbent firms are

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<sup>23</sup> Timothy Oakes, "Building a Southern Dynamo: Guizhou and State Power," *China Quarterly* 178 (2004): 467-487; Darrin Magee, "Powershed Politics: Yunnan Hydropower under Great Western Development," *China Quarterly* 185 (2006): 23-41. Darrin Magee discusses similar energy projects in the "Develop the West" campaign and finds little evidence of what he terms "central-state-strengthening".

<sup>24</sup> Timothy Frye and Andrei Shleifer, *The Invisible Hand and the Grabbing Hand* (Cambridge, MA: National Bureau of Economic Research, 1996); Andrew Walder, "Zouping in Perspective", in Andrew G. Walder (ed.), *Zouping in Transition: The Process of Reform in Rural North China* (Cambridge, Mass.: Harvard University Press, 1998, 16-23); Andrew Walder, "Local Governments as Industrial Firms: An Organizational Analysis of China's Transitional Economy," *American Journal of Sociology* 101, no. 2 (1995); Jean Oi, *Rural China Takes Off: Institutional Foundations of Economic Reform* (University of California Press, 1999. For an overview of varying approaches to the role of the local state in economic development see Tony Saich, "The Blind Man and the Elephant: Analyzing the Local State in China," in Luigi Tomba (Ed.), *On the Roots of Growth and Crisis: Capitalism, State and Society in East Asia*, (Annale Feltrinelli, 2002), pp. 75-99.

<sup>25</sup> For example Amy Jaffe et. al., "Beijing's oil diplomacy," *Survival* 44, no. 1 (2002): 115-134; Robert Ebel, "China's Energy Future: The Middle Kingdom Seeks Its Place in the Sun" (Center for Strategic & International Studies, 2005); Linda Jakobson and Daojiong Zha, "China and the Worldwide Search for Oil Security," *Asia-Pacific Review* 13, no. 2 (2006): 60-73.

many, financial resources for non-central state actors are limited, and political pressure to subsidize prices dominates the political economy landscape. The energy sector is portrayed as effectively closed to private and foreign investment, concentrated in structure, and suffering in competitive terms because of the direct role of the central state as an actor in the market.

These views of a consolidated sector managed by a consistently interventionist central state result from a bias in the literature towards analysis of the oil and natural gas industry in China. Particularly evident after China became a net oil product importer in 1993, these studies proliferated as the overseas investment activities of Chinese oil and gas firms grew during the late 1990s and early 2000s.<sup>26</sup> This attention has reinforced the view that China's energy sector is heavily concentrated and dominated by a handful of large incumbent firms, financed largely by the central government, and therefore resistant to major change, institutional or otherwise. However, these views are also evident in studies of the electric power industry as well. The central government, in this view, "controls virtually all aspects of [power plant] operation, including the amount and timing of the plants' scheduled output, setting and adjusting tariffs, performance of

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<sup>26</sup> For recent examples see: Richard J. Ellings, "'Going Out': China's Pursuit of Natural Resources and Implications for the PRC's Grand Strategy," *NBR Analysis*, vol. 17, no. 3, Sep. 2006; Ian Taylor, "China's Oil Diplomacy in Africa," *International Affairs*, vol. 82, no. 5, 2006, pp. 937-959; Amy Myers Jaffe and Steven W. Lewis, "Beijing's Oil Diplomacy," *Survival*, vol. 44, no. 1, Spring 2002, pp. 115-134; Kenneth Lieberthal and Mikkal Herberg, "China's Search for Energy Security: Implications for US Policy" (National Bureau of Asian Research, 2006); Daojiong Zha, "China's energy security: Domestic and international issues," *Survival* 48, no. 1 (2006): 179-190. Exceptions include Shaofeng Chen, "Motivations behind China's Foreign Oil Quest: A Perspective from the Chinese Government and the Oil Companies," *Journal of Chinese Political Science* 13, no. 1 (2008): 79-104; Erica Downs, "The fact and fiction of Sino-African energy relations" (Brookings Institution, 2007).

scheduled overhaul and maintenance procedures and compliance with grid control procedures”.<sup>27</sup>

Other authors argue that China’s central state is unable to remove itself as a direct owner, investor, and direct actor in the energy market because of its active suppression of alternative institutional mechanisms of market coordination such as legal dispute resolution through an independent judicial system, etc. The nature of the central state’s early involvement in the sector conditions future attempts at systemic reform. An interventionist state mediates conflicting interests in the economic and social relationships between major actors. Should the state remove itself from such direct involvement, such action can be “both economically disruptive and politically dangerous. Since groups do not emerge fully grown the moment the government decides to withdraw from its economic role, a regulatory substitute for direct state involvement must be found if relatively stable agreements are to be forged between groups with conflicting interests. These substitutes include alternative institutional mechanisms for resolving conflicts and the revitalization, creation, or legalization of corporate groups in civil society.”<sup>28</sup>

As the main findings of this study suggest, China’s central state has indeed maintained the ability to enforce a narrow but powerful range of regulatory functions that have had a great impact on the structure of the national energy sector. For the purposes of this study, the relevant functions include market access (project approval), contract price parameters, and personnel management. The central state institutions governing such functions have, despite reforms, been led by long-serving leaders and remained

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<sup>27</sup> Peter Nolan and Wang Xiaoqiang, “Harbin Power Equipment Company: The Battle for the Chinese Market,” *Competition and Change* 3 (1998), p.425.

<sup>28</sup> Kiren Chaudhry, “Economic liberalization and the lineages of the rentier state,” *Comparative Politics* (1994), p.7.

fairly stable. The State Planning Commission (SPC) that authorized project approvals and price parameters absorbed a potentially competitive State Economic and Trade Commission (SETC) in 2003 and was renamed the National Development and Reform Commission (NDRC). Many of the personnel and regulatory authorities remained constant. Personnel management for central state officials and senior provincial officials remained throughout periods of reform in the hands of the Central Organization Department (COD) of the Party. Such stability among a limited number of central state entities has enabled the state's portfolio approach to coal and electric power management that serves as the thesis of this study.

However, as the industry level data presented in Chapter Two illustrate, this portfolio approach explains the cyclic periods during which central state reforms aggressively lowered barriers to investment and ownership entry in the market, suspended for all intents and purposes project approval of major mines and power plants, liberalized contract prices ranges (particularly in coal), and established regulatory authorities with degrees of independence. This dissertation's two case studies detail the manner in which provincial and sub-provincial governments have proven to be vital to the successful provision of energy supply by serving as coordinating and mediating mechanisms at the local level between various actors, as well as between the central and local state. In addition, as the recent work of Andrew Mertha has shown, civil society actors have an increasing influence over the fate of major energy projects.<sup>29</sup> A range of state and non-state actors are able to provide such coordinating functions when the central state reduces its involvement in such aspects of energy supply provision.

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<sup>29</sup> Andrew Mertha, *China's Water Warriors: Citizen Action and Policy Change* (Ithaca: Cornell University Press, 2008).

*Elite Politics and “Political-Business Cycles” (PBCs)*

The final approach privileges the role of elite politics in explaining the evolution of China’s energy industry structure. Elite politics undoubtedly play an important role in the development of a nation’s energy sector, certainly in China.<sup>30</sup> Key political figures were central to the building of specific energy industries. Li Peng, China’s acting premier beginning in 1987, is often credited as the father of the nation’s modern electricity industry. During the final years of China’s civil war, he went to work as a technician for the Shanxi-Chahar-Hebei Power Company, going on to graduate studies in electric power engineering at the Moscow Power Institute in the Soviet Union. He then moved to Jilin province to work in the Fengman Hydroelectric Power Plant and eventually became Chairman of the National Power Administration during the Cultural Revolution then Minister of the Electric Power Industry between 1979 and 1983. This thorough academic and professional training in hydroelectric power largely guided his support of the *Sanxia* (Three Gorges) dam project during the 1980s and 1990s. The Li family has continued to shape the nation’s electricity industry, as Li’s son until 2008 served as the chief executive of the nation’s largest electric power generating firm and his daughter remains the chief executive of its fifth largest firm.<sup>31</sup> The historical “petroleum faction”, that included senior leaders of the 12<sup>th</sup> Central Committee such as Yu Qiuli, Kang Shien and Tang Ke, is another example of the direct link between the political fortunes of individuals and the nation’s energy sector.

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<sup>30</sup> See William Nordhaus, “The Political Business Cycle”, *Review of Economic Studies* 42 (1975); pp.169-89; Edward Tufte, *Political Control of the Economy* (Princeton: Princeton University Press, 1978); and Hu Angang, “Zhongguo zhengce zhouqi yu jingji zhouqi”, *Chinese Social Sciences Quarterly* 8 (1994); pp.85-100.

<sup>31</sup> Significantly, Li’s son has since entered formal government to become the vice governor of Shanxi province, the nation’s largest coal producing province.

Most importantly, at the factional level, critical shifts in elite politics empowering liberal reform-minded leaders often coincided with rapid economic growth. Such growth necessitated the liberalization of the energy sector to fuel economic demand. In this indirect manner, it can be argued that only a certain subset of elite shifts were able to influence energy policy and the structure of the energy sector more broadly. To have such an impact, elite shifts must have fulfilled the following criteria: i) led to liberal economic policy promulgation; ii) successfully strengthened economic growth; and also iii) required major energy supply increases. Conversely, lasting elite shifts that strengthened conservative leaders who in turn promulgated economic retrenchment policies that then led to economic stagnation and energy surplus could be credited with energy policies that consolidated institutions at the central level and consolidated energy industry structure.

However, during the critical early period of energy sector development in the 1980s, some of the clearest changes in elite politics did not result in similar changes in economic policy and energy outcomes. Clear moments of strengthening conservative factions did not often result in the consolidation of energy institutions at the central state level or the consolidation of central state ownership in the structure of the national energy industry. By mid-1986, in the first critical conservative shift in elite personnel that decade, opposition to the liberal reform group “was coalescing and the issue of political reform and the student demonstrations of 1986 enabled opponents to maneuver to remove reformist party secretary Hu Yaobang.”<sup>32</sup>

Despite the hardening of elite voices in Beijing and the rise of the conservative faction, liberalizing policy changes that same year (discussed in Chapter Two) allowed

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<sup>32</sup> Tony Saich, *Governance and Politics of China* (Palgrave New York, 2001), p.60.

the entrance of new investors upstream into coal, electric power and oil production. Provincial, municipal, and local governments, as well as private domestic and foreign firms were encouraged to invest in coal mines, power plants, and a range of oil refining and production activities. In order to strengthen this step-change in energy production, energy assets were also corporatized and the ministries of Petroleum, Water Conservancy and Power, and Coal Industries were eventually abolished. Many of the ministerial regulatory responsibilities were transferred to the new corporations. High economic growth rates well over 10 percent in 1987 reinforced this institutional and industrial structure diversification continued despite such conservative shifts in elite politics.

It was not until economic growth rates began to plummet in mid-1988 that a central Ministry of Energy was created. However, as Tony Saich has argued, the broader economic policies pushed by then-powerful conservative forces in the central government were rapidly weakened, despite the lack of an obvious liberal political resurgence. By May of 1990, less than a year after the June 1989 dismissal of liberal reformer Zhao Ziyang as General Secretary of the CCP during the fourth plenum of the 13<sup>th</sup> Central Committee, “there were clear signs that the orthodox attack was being blunted...Shaken by the economic downturn, and fearing social dislocation, measures were quietly introduced to ease the austerity program despite resistance by fiscal conservatives at the center.”<sup>33</sup> In short, despite a clear shift in elite politics that signaled the curtailment of liberal economic reforms and the return of policy retrenchment, “by stealth, the program of economic retrenchment was gradually being rolled back.”<sup>34</sup>

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<sup>33</sup> Ibid., p.68.

<sup>34</sup> Ibid.

Other scholars, such as Joe Fewsmith, have argued that the continued role of informal networks greatly undermined the formal authority of critical “tier-two” leaders such as Zhao Ziyang, rendering the impact of elite politics on industry structure even more difficult to measure. As a result, the influence on economic and industrial policy of change in formal institutional roles was often greatly reduced. Fewsmith writes: “Because Zhao was a second-echelon leader and senior appointments were controlled at a higher level than his own, he could never control the most important bureaucratic elements of the State Council, particularly the State Planning Commission...[he] could pressure, cajole, and compromise with the [SPC], but he could not command it and he could not have its leaders changed.”<sup>35</sup> The SPC, as Chapter Two details, played a central role in the promulgation of major policies that affected the industrial structure of the national energy sector.

**Figure 2. Elite Factional Cycles and Economic Cycles**

	<b>Factional Players</b>	<b>Primary Factional Goal</b>	<b>Distance Between Factions</b>	<b>Relation Between Business &amp; Reform Cycles</b>	<b>PBC Fluctuation &amp; Resulting Social Unrest</b>
<b>Cultural Revolution (1966-76)</b>	Mao & Cohort vs. the “Revisionists”	Security	Great	Inverse	Great/Quelled
<b>Deng Period (1979-1995/6)</b>	Pro-Reform vs. Conservative Groups	Conservatism vs. Economic Growth	Medium	Synchronized	Great/Eruptive
<b>Jiang Period (1995/6-2003)</b>	Pro-Reform vs. Populists	Distribution of Resources vs. Economic Growth	Short	De-synchronized	Mild/Limited

Source: Adapted from Dittmer and Wu, p.74.

<sup>35</sup> Joseph Fewsmith, *Elite politics in contemporary China* (East Gate Book, 2000), p.49.

Recent academic studies have contributed much to our understanding of the broad link between elite politics and national investment cycles in China, and have revealed that the relationship is at times inverted, at times synchronized, and at other times completely de-synchronized. As Lowell Dittmer and Yu-Shan Wu have documented, the relationship between business and political reform cycles is complex and the very nature of this relationship changes considerably between periods of political leadership.<sup>36</sup> Often these fundamental differences are driven by changes in the general policy goals of the political elite during certain historical periods.

During the Cultural Revolution (1966-76) the relationship between elite political cycles and business (economic) cycles was inverse, as sporadic attempts at liberal reforms resulted in political entrenchment and consolidation. During the Deng Xiaoping period (1979-1995/6) business and reform cycles were synchronized, with liberal policy introduction often resulting in economic growth and the diversification of economic actors. However, this link between political and economic cycles changed again with the Jiang Zemin period (1995/6-2003), a period in which Dittmer and Wu argue that the two were fully desynchronized. Relatedly, the authors point out that the focus of disagreement among factions relating to paramount goals of reform also changed dramatically during these periods. Security dominated elite factional battles during the Cultural Revolution, conservatism vs. economic growth dominated during the Deng period, and the equitable distribution of resources vs. continued rapid economic progress concerned the vying factions of the Jiang period.<sup>37</sup> Dittmer and Wu illustrate this

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<sup>36</sup> Dittmer and Wu, pp.49-80.

<sup>37</sup> Ibid., p.74.

considerable variance in the goals of elite debate, relation between business and reform cycles, and other aspects of elite reform with an effective chart, adapted below.

It is therefore difficult for an explanation resting solely on elite politics to explain the pattern of outcomes in energy industry structure and state institutions. This dissertation study spans two of these periods and continues through to a third leadership period under current president Hu Jintao, and therefore includes data from periods in which this political and economic cycle relationship was both synchronized and de-synchronized. Moreover, it is unclear how to characterize the Hu period in these terms, only complicating matters further. Even during the “synchronized” Deng period, major shifts in elite factional struggles did not directly result in similar shifts in policy, institutional, and energy outcomes.

#### *The Argument – A Portfolio Strategy*

This study builds in part on the approaches just discussed to offer a framework for analyzing the evolution of investment and ownership in China’s coal and electric power over the past three decades. This approach, as discussed previously, suggests that China’s central state manages the nation’s coal and electric power firms as a portfolio of assets. A portfolio is a managed collection of differentiated entities that is designed to mitigate risk.<sup>38</sup> Portfolios are frequently employed, whether in the relationships between individual and firm, between firms themselves, or between firm and state. Such an approach diversifies the channels through which risk is borne, thus reducing exposure to

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<sup>38</sup> For one of the clearest and earliest treatments of portfolio management, please see Harry Markowitz, “Portfolio selection,” *Journal of Finance* (1952): 77-91. A modified foundational analysis was later authored by William Sharpe, “A simplified model for portfolio analysis,” *Management Science* (1963): 277-293; and expanded upon by Kenneth Arrow, *Aspects of the theory of risk-bearing* (Helsinki, 1965).

high levels of any one specific risk. The portfolio concept has been applied to a range of topics and to a range of relationships.

Individual investors often design a portfolio of investments in a diverse range of firms that allows the management of volatile equity price risk that is inherent in any single investment. As Marshall Blume writes, a portfolio strategy enables the evaluation of complex risk as a whole rather than as a set of separate risks in discrete activities. Blume explains in a simple example: “Consider two assets, each of which by itself is extremely risky. If, however, it is always the case that when one of the assets has a high return, the other has a low return, the return on a combination of these two assets in a portfolio may be constant. Thus, the return on the portfolio may be risk-free whereas each of the assets has a highly uncertain return.”<sup>39</sup>

Firms themselves often use a portfolio approach to manage the price risk inherent in supplier transactions. For example, a firm may choose to design a portfolio of contracts in which 60 percent of supplier contracts are *long-term*, 25 percent are *options* contracts that allow purchasing within pre-negotiated bands of prices, and 15 percent are *spot* purchase contracts.<sup>40</sup> The aggregation is termed a “portfolio contract” and is a combination of these types of contracts.<sup>41</sup> A firm manages and rebalances the portfolio given changing economic conditions, new supplier information, etc. In the energy sector, because electric power producers sign a significant portion of long-term contracts for fuels that contain price adjustment clauses, “the companies must estimate the factors that might cause the prices of these fuels to go up or down. This situation brings an

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<sup>39</sup> Marshall Blume, “On the assessment of risk,” *The Journal of Finance* (1971), p.2.

<sup>40</sup> R. F. Olsen and L. M. Elfram, “A portfolio approach to supplier relationships,” *Industrial Marketing Management* 26, no. 2 (1997): 101-113.

<sup>41</sup> Victor Martínez-de-Albéniz and David Simchi-Levi, “A portfolio approach to procurement contracts,” *Production and Operations Management* 14, no. 1 (2005): 90-114.

uncertainty factor to the decision making process of buying fuels and is analogous to the problem of selecting risky securities. In buying risky securities the problem is one of estimating the returns, risks, and correlations of the securities, where the risk is defined as the standard deviation of the expected return on the portfolio, and the goal is to maximize the return of the portfolio for a given risk.”<sup>42</sup>

States may also use a portfolio strategy to mitigate risk; a strategy particularly relevant in the management of technology and supply risk in the energy sector.<sup>43</sup> As the US Department of Energy (DOE) has consistently argued, the US pursues a portfolio approach to the diversification of national energy supply.<sup>44</sup> At times certain fuels in that portfolio are encouraged or discouraged through legislation such as the 1978 Power Plant and Industrial Fuels Act (PPIFA), part of the sweeping National Energy Conservation Policy Act of the early Carter administration, which prohibited the use of oil and natural gas as fuel for base-load electricity generation. Similarly, the US argues for the use of a portfolio approach to mitigate technology risk in climate change mitigation, choosing to invest research and development (R+D) funds into a shifting range of short-term and long-term solutions that carry varying degrees of such risk. China’s central government, historically through the State Atomic Energy Agency<sup>45</sup>, has characterized its engagement in technology acquisition of nuclear electric power generation equipment as one of

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<sup>42</sup> Dan Bar-Lev and Steven Katz, “A Portfolio Approach to Fossil Fuel Procurement in the Electric Utility Industry,” *Journal of Finance* 31, no. 3 (June 1976), p. 933.

<sup>43</sup> For a systematic analysis of the role of government in managing risk, please see David Moss, *When all else fails: government as the ultimate risk manager* (Harvard University Press, 2002).

<sup>44</sup> For an example, see US Department of Energy, *Comprehensive National Energy Strategy* (Washington, DC: Department of Energy, 1998).

<sup>45</sup> The SAEA is under the State Council’s Commission for Science, Technology and Industry for National Defense (COSTIND). Technology selection in particular is currently executed by the State Nuclear Power Technology Corporation.

supply strategy through portfolio management.<sup>46</sup> This has been achieved largely through the continual adoption of several concurrent competing technologies from various countries, rather than convergence on one particular advanced technology.

As stated previously, portfolio approaches to investment relationships, contracts, technologies and many other aspects of control seek to manage risk. Risk can be economic or political in nature. Economic risk ranges from the general, such as the stability of interest rates for a given nation or the deviation of return-on-investment (ROI) for a range of investment assets, to the specific, such as the risk that a particular project's output will not generate sufficient revenues to cover operating costs and to repay debt obligations. Political risk can be similarly broad in nature, from the general, such as levels of political administration stability, to the specific, such as the probability of a project's assets being expropriated and nationalized by the state. Other risks may be a combination of both political and economic factors, such as the probability of energy supply or inventory disruption. Portfolios allow an investor to re-adjust the composition of risk that the total investment is exposed to, according to circumstance and new information. Should re-adjustment not take place, risky components of the portfolio that grow rapidly in one period may begin to outweigh the less risky components that have been unable to generate high returns. In the long term such imbalance may prove disastrous once these risky investments encounter an economic downturn and the majority of the portfolio is lost.

#### *The Role of Functionalism and Ideational Frames*

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<sup>46</sup> See Dazhong Wang and Yingyun Lu, "Roles and prospect of nuclear power in China's energy supply strategy," *Nuclear Engineering and Design* 218 (November 2003), 3-12; also Sheng Zhou and Xiliang Zhang, "Nuclear energy development in China: A study of opportunities and challenges", *Energy* (IN PRESS 2009).

As stated previously, the Chinese central state's portfolio approach to the management of its national coal and electricity industries serves as a method for mitigating the considerable risk inherent in the energy sector. The sector's long investment cycles, the capital intensity of electricity production, the natural monopolies of electricity transmission, and other aspects of the energy value chain all present considerable financial, regulatory, and security of supply risks to the state. These critical aspects of the energy sector create functional necessities for large capital agglomeration, long-term management of supply and demand, the creation and enforcement of safety standards, technological upgrading, and other needs. These functions are particularly under strain during periods of high economic growth. For example, long-term supply investments in such periods do not match short-term demand change, and capital agglomeration is therefore pressured to deploy such investments more rapidly. These functional necessities are universal to energy provision. As a result, there is a range of policy responses that seek to provide such functions.

Yet states react differently to such risks and to which actors carry out which functions. Perception is critical in assessing the nature, scale, and priority of different forms of risk. Such perception is clearly influenced by ideational frames often motivated by historical, cultural, ideological and other influences. As a result, ideas matter greatly in how risk is measured. The following section clearly separates the functionalist aspects of the portfolio approach from the ideational aspects, and explains how the functionalist aspects shape the range of policies adopted by the state while the ideational aspects shape the state's assessment of risk. Ultimately, these two aspects are necessary to understanding the portfolio approach itself and the cycles of consolidation and

diversification in ownership and investment evident in China's coal and electric power industries. This section will first outline functionalist analysis, then highlight several important criticisms of functionalism.

Understood in its most abstract and minimal form, a functionalist argument suggests that a given system is governed by self-preservation. The goal of successful self-preservation and system stability require the fulfillment of key functions through certain mechanisms. As Robert Merton has written: "Functions are those observed consequences which make for the adaptation or adjustment of a given system".<sup>47</sup> A. James Gregor offered an early biological analogy to explain functionalist arguments. Gregor wrote that: "the human body maintains its temperature in a fairly constant [thermal] state as a consequence of the operation of the thyroid gland, the dilation and the contraction of blood vessels carrying blood and radiating heat through the skin...all adaptive or compensatory variations made in response to primary thermal variations in the external environment."<sup>48</sup> Both a competitive market economy and a human body attempt to maintain stability through cyclic adjustments based on system needs: either the need to have marginal demand equal marginal supply or the need to maintain the body's normal thermal state between 97.3 and 99.1 degrees Fahrenheit. Carl Hempel notes that: "Embedded in every functionalist analysis is some conception, tacit or expressed, of the functional requirements of the system under observation".<sup>49</sup> It is the often tacit nature of functional assumptions that weaken the functionalist approach, as the underlying mechanisms of change are left under-specified.

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<sup>47</sup> Robert Merton, *Social Theory and Social Structure* (Glencoe, Ill: Free Press, 1957), p.51.

<sup>48</sup> A. James Gregor, "Political science and the uses of functional analysis," *The American Political Science Review* (1968), p.433.

<sup>49</sup> Carl Hempel, "The logic of functional analysis," *Readings in the Philosophy of Social Science* (1959), p.365.

There are two primary criticisms leveled at functionalist arguments that are most relevant to this study. First, scholars such as Hempel have argued that much of this work suffers from “inadequate specification of scope”.<sup>50</sup> According to functionalist explanations, systems have certain limits of tolerance that must be explicitly stated. In the biological example, the human body must maintain a certain thermal range in order to avoid expiration. Should no minimum and maximum value for such a range be specified, it is difficult to falsify functionalist claims. Hempel therefore argues that functionalism requires an argument based on “self-regulation with respect to the range ‘R’ of the permissible values within which the requisites can vary and the system be self-regulating.”<sup>51</sup> These requisites must be established in order to test the validity of such an argument empirically.

Second, other scholars, such as Robert Holt, demand further precision from functionalist approaches, arguing that the focus on self-regulating stability in a system precludes discussion of evolutionary change and therefore unnecessarily privileges stasis in the system.<sup>52</sup> Early functionalists, such as Merton, certainly recognized the importance of adaptive responses, as they are central to functionalist analysis. System stability is clearly difficult to maintain at all times, as functional deficiencies emerge that threaten the economy or organism in question. Under such circumstances Merton argues that: “the functional deficiencies of the official structure generate an alternative (unofficial)

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<sup>50</sup> Ibid., p.364.

<sup>51</sup> Jerone Stephens, “The Logic of Functional and Systems Analyses in Political Science,” *Midwest Journal of Political Science* (1969), p.373.

<sup>52</sup> See Robert Holt, “A Proposed Structural-Functional Framework for Political Science,” in D. Martindale (ed.) *Functionalism in the Social Sciences: The Strength and Limits of Functionalism in Anthropology, Economics, Political Science, and Sociology* (Philadelphia, PA: American Academy of Political and Social Science, 1965).

structure to fulfill existing needs somewhat more efficiently.”<sup>53</sup> In other words, when disequilibrium threatens stability, the system allows the creation of “shock absorbers”, often unofficial in nature, to meet the needs of the system. Critics argue that such logic must be explicitly extended to its conclusion – that these adaptive, more efficient new structures that are fulfilling existing needs then replace old structures that are failing such needs. Functionalism, it is argued, is again tacit in its assumptions and therefore does not afford adequate analytical weight to how adaptations may change the nature of the system itself. This modification of functionalism posits that while the overall characteristics of the system may remain through time, it is important to note the important shifts at the micro-level.

In summary, functionalist analysis is founded upon a claim that a given system is continually seeking to maintain its stability and ensure self-preservation. During periods of disequilibrium and instability produced by functional inefficiencies, “unofficial” alternative structures are established to address system needs that are not being fulfilled. Critics have rightfully claimed that many arguments based on functionalist analysis have left under-specified the range of conditions in which a system can be described as stable and in equilibrium, and outside of which would be described as unstable and lacking equilibrium. Other scholars have argued that the majority of functional analysis does not adequately capture and address how evolutionary adaptation and change can occur in such systems.

This study explicitly addresses the first criticism, relating to under-specified range, by linking the rise of alternative mechanisms (in China’s case, locally owned coal mines and power plants) to policy periods with specific values of economic growth

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<sup>53</sup> Merton, in Hempel, p.364.

(above nine percent) and resulting values of national electricity balance (when deficit occurs). This is accomplished through industry level data analysis and firm level analysis in the case studies. The study also addresses the second criticism, relating to evolutionary change, by contrasting the persistence of the firm in Chapter Three to the effective nationalization of the firm in Chapter Four. The Jinyuan Group case in Chapter Three illustrates that central state-owned firms of the present, created through acquisition of these local firms born as alternative structures during periods of high growth, are not organized in the same manner as traditional central state-owned firms.

However, despite the study's more precise use of functional analysis to explain the relative rise of locally-owned and invested mines and plants, functionalism alone is insufficient to describe the relative fall of such firms. Were the functionalist goal of ensuring adequate national electric power supply the only goal of the central state (particularly after the reforms announced during the Third Plenum of the 11<sup>th</sup> Chinese Communist Party Congress in December 1978), then the level of central state ownership and investment in these industries would deteriorate over time, much as they have in other sectors of the economy.<sup>54</sup> In periods of high economic growth that demanded increased energy supply, local state and non-state owned firms would indeed be created as the "shock absorbers" predicted by functional analysis. These firms would provide the flexibility and resources necessary to fulfill such need over time, as their efficiency levels greatly exceeded those of central state plants and mines that were failing to meet demand.

According to strict functionalist analysis, as excess energy demand begins to ease, the closing of firms would proceed according to each firm's ability to fulfill the system's needs. Those firms that were inefficient (mostly central state-owned) would be closed

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<sup>54</sup> Barry Naughton 1995.

down, as they were less likely to fulfill the function of meeting demand. During the next period of rapidly increasing demand, more local state and non-state firms would be introduced, and central state ownership would thus incrementally be reduced to the margin.

Empirically, as discussed earlier, levels of central state ownership and investment in China do not decline continuously in these industries. If the sole goal were ensuring adequate national energy supply, it would not result in the identified cycles of consolidation and diversification apparent in the ownership and investment structure of China's coal and electric power supply industries. Electricity deficit leads to the relative growth of local non-state coal mines and locally owned (state and hybrid) power plants. Electricity surplus leads to the relative decline of these local mines and plants, either through outright nationalization, closure, or indirect acquisitions by incumbent firms. It is in explaining the periodic relative decline of these local firms that the role of ideational factors is critical to the portfolio argument.

The maintenance of public ownership has long been featured prominently in academic and policy discussions of economic development in China. The rationale linking public ownership and China's ideology of Marxist-Leninist-Mao Zedong Thought rests on what can be termed both "fundamental" and "instrumental" principles.<sup>55</sup> In fundamental terms, public ownership erases the distinction between owner of capital and worker, thus advancing society to a stage that is increasingly classless and nearer the utopian ideal (however vaguely Marx envisioned such an endpoint).<sup>56</sup> In instrumental

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<sup>55</sup> Feng Chen, *Economic transition and political legitimacy in post-Mao China: ideology and reform* (State University of New York Press, 1995), p.23.

<sup>56</sup> Karl Marx and Frederick Engels, *Karl Marx and Frederick Engels: selected works in one volume* (International Publishers, 1968).

terms, public ownership enabled the comprehensive economic planning sought by leaders such as Mao during the early years of the PRC. Consolidation of economic actors through collectivization and other forms of state ownership enabled an under-institutionalized and immature governing apparatus to begin directing resources to priority (urban) areas of the economy and to particular industries.

Both fundamental and instrumental arguments for the support of public ownership are particularly apparent and influential in the case of China's energy sector. Energy in China, as in most economies, is strategic in nature, largely because of its central importance to sustaining economic growth and the link between such growth and political legitimacy.<sup>57</sup> As a result, the CCP has historically characterized energy industries, including the coal and electric power industries, as “backbone” (*gugan*) or “lifeline” (*mingmai*) activities critical to the nation. While industrialization requires strong and healthy energy firms to provide the resources necessary for growth, the central state maintains a significant distrust of independent sources of power – economic, political, or otherwise. As Saich argues: “Most writers agree that the leaders of the post-1949 state not only inherited China's traditional statist disposition but also that they sought far greater control over and penetration of society than their Imperial and Nationalist predecessors”.<sup>58</sup> The state's need for the creation of efficient and productive firms, particularly during periods of rapid economic growth, is therefore in frequent tension

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<sup>57</sup> For more on this specific link between growth and legitimacy in this context, see Kenneth Lieberthal and Michel Oksenberg, *Policy making in China: leaders, structures, and processes* (Princeton, N.J.: Princeton University Press, 1988), Vaclav Smil, *Energy in China's Modernization: Advances and Limitations* (ME Sharpe, 1988), Elspeth Thomson, *The Chinese Coal Industry: An Economic History* (Routledge, 2003), Yi-chong Xu, *Electricity reform in China, India and Russia: the World Bank template and the politics of power* (Edward Elgar, 2004), and Emily Yeh and Joanna Lewis, “State power and the logic of reform in China's electricity sector,” *Pacific Affairs* (2004): 437-465.

<sup>58</sup> Saich, p.195.

with the desire to control the activities of such actors in order to limit their potential political impact.<sup>59</sup>

This tension is reflected in the accommodative tone that modern reforms have at times adopted in this sector. Communist ideology regarding ownership of enterprises in these industries has historically emphasized the primacy of public ownership, however since the late 1970s and the beginning of the reform period additional forms have been tolerated and even encouraged. Under the leadership of Deng Xiaoping, economic development replaced the maintenance of public ownership as the primary goal of the state. As Naughton has highlighted: “economic development was adopted as the primary goal of the Communist Party at the 3<sup>rd</sup> plenum”.<sup>60</sup> Public ownership continued to be officially supported, however alternative forms of ownership were also supported according to basic principles that have remained fairly constant in the past three decades. First, economic development, it was argued, should be achieved “with public ownership as the base, together with diversified ownership forms” (*gongyouzhi wei zhuti, duozhong suoyouzhi jingji gongtong fazhan de jiben jingji zhidu*). Second, economic development required “uniting government guidance and market adjustment” (*zhengfu yindao he shichang tiaojie xiangjiehe*).<sup>61</sup>

In any economy, the state may influence the activities of energy actors by occupying a range of positions or directly fulfilling a range of functions. The state may

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<sup>59</sup> It is instructive to note that the first several years after the PRC’s founding witnessed the state’s tolerance and limited support of maintaining multiple forms of ownership (state-owned, cooperative, private, and joint state-private) in the energy sector, as the state was seeking to support and maintain early growth of an economy undone by decades of war. Chen, p.27

<sup>60</sup> Barry Naughton, “Market Economy, Hierarchy, and Single Party Rule: How Does the Transition Path in China Shape the Emerging Market Economy?” draft paper presented to the International Economic Association, Hong Kong, January 14-15, 2004.

<sup>61</sup> “Guanyu tuijin guoyou ziben tiaozheng he guoyou qiye chongzu de zhidao yijian”. Available at: <http://www.sasac.gov.cn/gzjg/xcgz/200612180138.htm>.

act as *owner* (through equity), as *creditor* (through debt), as direct *supplier* (through monopoly), as direct *buyer* (through monopsony), and/or as *regulator* (through oversight of competition/market power and other issues relating to economic regulation, as well as social regulation relating to market failure concerns). As the chart below suggests, and Chapter Two analyzes in detail, China's central state has formally relinquished its role in the energy sector as direct owner and provider of equity, as direct creditor, and as direct sole supplier and buyer of energy resources. Many of these rights have been granted to corporations. This process of corporatization, while certainly not comprehensive in its execution, sought to sever the link between state ownership and state management of such resources. As a result, as others have highlighted and the subsequent case studies illustrate in detail, these firms have indeed grown economically powerful and developed significant autonomy in management and financial decision-making.<sup>62</sup>

**Figure 3. Range of State Functions in the Market**

<u>Function</u>	<u>Actor</u>					
	<u>Govt</u>		<u>Firm</u>			
	Central Govt	Prov. Govt	Domestic Firm (Govt owned)	Domestic Firm (Hybrid - Pub./Priv.)	Domestic Firm (Private)	J.V. Firm (Foreign + Domestic)
<b>Owner (Equity)</b>	XX	XX	XXXXXX	XXXXXX	XX	X
<b>Creditor (Debt)</b>			XXXXXX	XXXXXX	XX	XX
<b>Regulator</b>						
<i>Personnel Mgmt</i>	XXXXX	XX				
<i>Project Approval</i>	XXXX	XXX				
<i>Merger + Acq. Approval</i>	XXXXX	XX				
<i>Environ. Assessment</i>	XX	XX				
<b>Supplier (Monopolist)</b>			XXXXX	XXXXX	X	X
<b>Buyer (Monopsonist)</b>			XXXXX			

*N.B.:* Number of Xs indicates stronger functional capacity by a given set of actors.

To regulate this new landscape of economic actors, regulatory institutions at the

<sup>62</sup> Philip Andrews-Speed, *Energy policy and regulation in the People's Republic of China*, International energy and resources law and policy series, 19 (The Hague: Kluwer Law International Press, 2004).

central level have also reformed, reflecting the wave of economic liberalization that first began in economies such as the US and the UK, as discussed in the first section of this chapter. As Margaret Pearson argues, China's creation of formally independent regulatory agencies "in form, is consistent with, and informed by, key tenets of the global wave of regulatory reform: releasing some economic functions from direct government management; establishing regulators as market 'referees'; and increasing the capacity and efficiency of the economic bureaucracy."<sup>63</sup>

However, it is important to note that while formal regulatory institutions in China have to some degree modeled themselves after the "regulatory state", the CCP has retained key aspects of control at the central level - namely personnel management and the majority of project approval powers. This concentration of influence is critical, and illustrates the longstanding importance to the central state of maintaining the ability to influence corporate decision-making. Central state ownership, and the formal right of personnel management that such ownership legitimates, effectively complements the project approval and other regulatory rights that the state has retained despite liberalization reforms. As Margaret Pearson again argues: "It is important to emphasize that it is not, as often characterized, bureaucratic inertia and vested interest that keeps the state-owned sector alive. Rather, it reflects a conscious effort by the Chinese government to concentrate and consolidate this top tier as a key part of China's development strategy."<sup>64</sup> While vested interest (for example, in the form of the State-owned Asset Supervision and Administration Commission - SASAC) undoubtedly plays a role in the periodic rise of central state ownership and investment, Pearson's larger point is worth

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<sup>63</sup> Pearson, p.7.

<sup>64</sup> Ibid., p.14.

highlighting.

Despite considerable economic liberalization, energy industries historically have been identified as areas in which central state ownership and management should be “pushed” or “furthered” (*tui jin*) to ensure an absolute controlling (*juedui kongzhi*) shareholder stake.<sup>65</sup> This has not been the case in many other industries, as Barry Naughton and other scholars have well documented.<sup>66</sup> Even two years after the widely-referenced and critical 15<sup>th</sup> Party Congress Report, in which China’s President Jiang Zemin provided ideological rationalization for the inclusion of entrepreneurs in the Communist Party and Party support of private capital, the Fourth Plenum made clear that “natural monopoly” industries such as energy and other “lifeline” industries required control through the state-owned economy “*guoyou jingji xuyao kongzhi*”.<sup>67</sup>

Such special treatment has continued to the present day. Specifically, national defense, electric power, petroleum and petrochemical, telecommunications, coal, civil aviation, and shipping industries were again identified by the State-owned Supervision and Administration Commission (SASAC) as recently as 2009 as requiring the strengthening of central state ownership and management.<sup>68</sup> In recent years these

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<sup>65</sup> “China names key industries for absolute state control” *China Daily*, December 19, 2006. See also Dahe Daily, “*Qi da hangye bixu you guozhi kongzhi, qi da hangye baokuo jungong, dianwang dianli, shiyou shihua, dianxin, meitan, minhang, hangyun*” December 19, 2006. [http://epaper.dahe.cn/dhb/htm2006/t20061219\\_774304.htm](http://epaper.dahe.cn/dhb/htm2006/t20061219_774304.htm)

<sup>66</sup> For one of the more recent treatments of the central state’s attempt to reduce state ownership in broader industries, see Barry Naughton, “Selling Down the State Share: Contested Policy, New Rules”, *China Leadership Monitor*, No.1, Part 2, March 2002. His excellent analysis of the drive to increase state shares in strategic sectors such as energy have focused on the rise of SASAC; see for example Barry Naughton, “SASAC Rising”, *China Leadership Monitor*, No.14 Spring 2005; and Barry Naughton “Top-Down Control: SASAC and the Persistence of State Ownership in China”, draft conference paper, June 26, 2006.

<sup>67</sup> CCP Central Committee Circular, “Zhonggong zhongyang guanyu guoyou qiye gaige he fazhan ruogan zhongda wenti de jue ding”, Fourth Plenum of 15<sup>th</sup> Chinese Communist Party Congress, September 22, 1999, in SASAC, *Zhongguo guoyou zichan jian du guan li nian jian 2007*, (Beijing: Zhongguo Jingji Chubanshe, 2007).

<sup>68</sup> Kang Yi, Liu Weixun, “List of key Chinese subsidiaries ‘Not For Sale’ being drafted” *Economic Observer* (January 19, 2009). <http://www.eeo.com.cn/ens/Industry/2009/01/22/128015.shtml>.

industries were enumerated in a December 5, 2006 SASAC promulgation entitled: “Guidelines and Opinions Regarding the Furthering of State-owned Capital Adjustment and the Reorganization State-owned Enterprises”.<sup>69</sup>

### Methodology

#### *Single Country Studies*

All academic studies seek some balance between levels of analytic breadth and analytic depth. The findings offered by studies that capture variation among multiple industries, countries, and time periods leverage such breadth and are often applicable to many scenarios and sets of circumstances. Underlying mechanisms of change in such studies often require more micro-level research and are therefore lost. In contrast, narrower studies that do reveal the nature of such mechanisms are often criticized for findings that are unable to be applied to other circumstances. John Gerring has described this constant analysis of trade-offs, writing: “Research designs invariably face a choice between knowing more about less and knowing less about more.”<sup>70</sup> This study explicitly privileges analytic depth over breadth in an effort to capture the variation that single country studies can provide. The study varies: i) sub-nationally (between provinces of China); ii) temporally (through three decades of reform); iii) between industries (coal and electric power generation); and iv) between firms (through two firm-level case studies).

As Pepper Culpepper argues: “Sub-national variation among administrative units...has the great virtue of holding many other potentially causal variables constant.”<sup>71</sup>

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<sup>69</sup> “Guanyu tuijin guoyou ziben tiaozheng he guoyou qiye chongzu de zhidao yijian”. Available at: <http://www.sasac.gov.cn/gzjg/xcgz/200612180138.htm>.

<sup>70</sup> John Gerring, “What is a Case Study and What is it Good for?,” *American Political Science Review* 98, no. 02 (2004), p.348.

<sup>71</sup> Pepper Culpepper, “Single Country Studies and Comparative Politics”, *Italian Politics & Society*, No. 6 (Spring 2005), p.2.

This study of the changing structure of China's electric power generation and coal industries is able to test with rigor the relationship between national policies and industry structure because it omits many of the cultural and other intervening variables that are introduced in multi-country studies. Temporal variation is also critical, as "many contemporary debates in political science are concerned with issues of sequencing and contingency in causal analysis".<sup>72</sup> Variation over time is central to this study, revealing the cycles of consolidation and diversification of industry structure in China's energy sector throughout the modern reform period. Finally, inter-firm variation is vital, especially in a treatment of the effects of national policies on industry structure. Such variation allows the researcher to understand the manner in which state policies interact with different firms in a given industry, lending internal validity to conclusions reached and reinforcing trends identified through initial analysis of industry level data.

#### *Case Studies*

This study primarily employs the case study method, supported with industry level energy data and select results of a unique electric power generation industry survey designed and executed together with MIT Profs. Edward Steinfeld and Richard Lester, along with the Horizon Group.<sup>73</sup> In methodological terms, case studies, particularly when selected from the same country, strengthen the internal validity of an argument by controlling for numerous variables, and enable the study to identify the causal mechanisms critical to the argument. Cases also, by the more open-ended nature of the

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<sup>72</sup> Ibid., p.2. See also Paul Pierson, *Politics in Time: History, Institutions, and Social Analysis*, (Princeton, Princeton University Press, 2004) and William Sewell, "Three Temporalities: Toward an Eventful Sociology." In Terrence McDonald (ed.), *The Historic Turn in the Human Sciences* (Ann Arbor: University of Michigan Press, 1996), pp. 245-280.

<sup>73</sup> The Horizon Group is a private professional research and consultancy firm in China founded by Victor (Yue) Yuan.

process of data discovery, are suited well to “explanatory” or “theory-building” efforts. Finally, in practical terms, case studies also allow for granularity of analysis that is rendered impossible in cases of unsystematic time series data, as is the case in China’s electric power generation industry, and illuminate the range of actors not captured in broad data categories.

First, case studies from the same country allow for increased internal validity, as the cases are comparable along many variables of culture and formal administration and can be varied explicitly along other variables, such as levels of economic development. It is important to note that the strengthened internal validity of single country studies entails a corresponding weakness in external validity, as the representativeness of the argument as applied to other countries is undermined. Second, as Clayton Roberts argues, case studies allow us to “peer into the box of causality” (often only imputed in quantitative measures of causal effects), through “the minute tracing of the explanatory narrative to the point where the events to be explained are microscopic and the covering laws correspondingly more certain”.<sup>74</sup> Case studies unearth and hold in relief the causal mechanisms that drive broader theoretical arguments and empirical outcomes.

Third, case studies are well suited to what Gerring categorizes as “exploratory” studies (and what Eckstein termed “theory-building” efforts).<sup>75</sup> Gerring argues that “the very ‘subjectivity’ of case study research allows for the generation of a great number of hypotheses, insights that might not be apparent to the cross-unit researcher who works

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<sup>74</sup> Clayton Roberts, *The Logic of Historical Explanation* (University Park: Pennsylvania State University Press, 1996), p.66. See also Gerring, p. 348, and George and Bennett 2004. Alexander George and Andrew Bennett, *Case studies and theory development in the social sciences* (Cambridge, MA: MIT Press, 2005).

<sup>75</sup> See Harry Eckstein, “Case studies and theory in political science.” in *Handbook of political Science*, v.ii: *Political Science; Scope and Theory*, ed. F.I. Greenstein and N.W. Polsby (Reading, MA: Addison-Wesley, 1975), pp. 79-133 and Gerring 2004.

with a thinner set of empirical data across a large number of units and with a more determinate (fixed) definition of cases, variables, and outcomes.”<sup>76</sup> While often arduous in task and initially bewildering in complexity, case studies offer the opportunity to reorganize and redefine a hierarchy of variables in repeated attempts to understand empirical outcomes. Rather than looking under the proverbial “lamppost” that illuminates through progress in quantitative tools based upon previous attempts at data collection, a researcher analyzing a case study of the French Revolution, for example, is able to conceptualize the case “as a study of revolution, of social revolution, of revolt, of political violence, and so forth. Each of these topics entails a different population and a different set of causal factors.”<sup>77</sup>

Finally, in practical terms, specific industry time series data can often be unsystematic. This is particularly prevalent in the case of developing economies undergoing periodic overhauls in the institutions and identities (firm, government, NGO, or otherwise) responsible for data collection. Because of redefinitions and gaps in data collection, time series data are often distilled to overly vague and broad categories that conceal more than they reveal. In China’s case, despite institutional consolidation and diversification, ownership and investment data for the coal industry has remained fairly consistent. In contrast, ownership and investment data for China’s electric power generation industry is more sporadic in nature. This study seeks to utilize the inherent advantages of both strengthened internal validity and of a focus on causal mechanisms that case studies lend to the theory-building enterprise, and to combine this approach with

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<sup>76</sup> Gerring 2004, p. 350.

<sup>77</sup> Ibid.

industry-level data and survey data that reinforce this study's argument – namely that the state is actively managing a portfolio of firms.

#### *Case Selection and Variation*

The cases for this study are selected from China's electricity generating industry. Within this industry, two firms are selected from the category of firms that represents the majority of electricity generating assets in China: "local state-owned". This expansive category accounted for 51 percent of China's installed electric generating capacity in 2007, and is an amalgamation of many different sub-sets of ownership types. There are two sets of rationale for the selection of this energy sub-sector and two sets of rationale for the selection of the specific firms.

China's coal industry is discussed at length in this study, however the in-depth cases are selected from the electric power generation industry. The reasons behind this decision are fairly straightforward. First, over two-thirds of China's coal is transformed into electricity. As a result, changes in the electricity market's balance of supply and demand have significant consequences for the demands placed on the coal industry. Second, as stated previously, in contrast to the coal data, much of the time-series data relating to ownership and investment levels in China's electric power generation industry have proven to be unsystematic and therefore understudied. Case studies enable the data that does exist to be linked to firm and state decisions that further illuminate the distinctions between firms that are not captured in such datasets.

Firm selection also follows two sets of rationale. First, as noted previously, the firms were chosen from the largest category of electric power firms in China: local state-owned. These firms are responsible for over one-half of China's installed capacity.

Second, these firms are “hard” cases. The study argues that the central state seeks to manage ownership and investment levels relating to coal and power firms through a portfolio approach to risk. These local firms are highly independent from the central government, able to raise private capital and create diversified local ownership strengthened by local government protectionism. Such firms therefore provide convincing “hard” cases to document the manner in which the central state may exercise levers of influence over time. In contrast, a study that is based upon cases of firms that comprise the former state electric power monopoly (and are owned by the central state) may bias the results in favor of the argument.

Finally, the two cases vary according to geography and levels of economic development. The Jinyuan Group case describes the rise of a firm from Guizhou – an interior province located in China’s southwestern region. The Luneng Group case describes the rise of a firm from Shandong – a province located in China’s eastern coastal region. Such variation is important, as geography can often be a proxy for political relations with the central state leadership, either through the quirks of historical postings of leaders in power at a given time or through strengthened historical institutional networks that privileged coastal regions. For example, the current President and General Secretary of China once served as Party Secretary of the province in which one case is located (Guizhou), but never served in the government of the province from which the second case is selected (Shandong). Interestingly, after several attempts of asset nationalization by various central actors, the firm located in Guizhou maintains more independence and corporate integrity than the firm located in Shandong.

These cases also provide considerable variation in economic terms. Guizhou is the poorest of China's provinces in per-capita terms while Shandong enjoys the second highest GDP, after Guangdong. Variation in levels of economic development is important as it allows variation in levels of non-state economic resources available to local firms. For example, cases selected exclusively from coastal provinces could bias results by analyzing only those firms with significant financial independence from central state transfers and state bank debt financing.

#### Dissertation Outline

The following chapter first outlines the relationship between China's electric power balance and changes in central state policy towards the coal and electric power industries, changes evident not only in policy pronouncements but also fluctuations in the consolidation and diversification of central level regulatory institutions. The chapter then analyzes the impact of such policy change on central state, local state, local non-state and foreign ownership and investment levels in the coal and electric power industries through time. Chapters Three and Four shift the analytic focus to the firm level to document the ways in which these shifts in central state policy were negotiated between the firm and central and local government actors and the impact of such policies. Chapter Three tracks the rise of Jinyuan Group, an initially private electric power generation firm that is partially nationalized through a forced merger but retains much of its corporate integrity. Chapter Four tracks the rise of Luneng Group, a hybrid public/private electric power generation firm that is fully nationalized only months before Jinyuan's merger. Chapter Five returns to the portfolio approach to reflect on its utility in understanding China's current challenge: its ability to fulfill national goals for the reduction of greenhouse gas

emissions, which are very much linked to national energy supply – in particular, the coal and electric power generation industries.

## CHAPTER TWO

### **Economic Growth and Industrial Organization: The State in China's Coal and Electric Power Industries**

#### *Introduction*

This chapter illustrates empirically how China's central state has successfully met national energy demand for electricity through the periodic dilution and consolidation of investment and ownership in its electric power and coal markets. As previously discussed, China's model is distinctly not one of incremental liberalization of investment and ownership, pursued in an effort to achieve a discrete goal of a market-oriented energy sector. Nor is it the rapid implementation of a package of far-reaching market reforms. The central government has instead pursued measured sets of liberal policies during times of high economic growth<sup>78</sup> and energy shortage, then often revisited these policies when high economic growth rates decline and shortages subside. As a result, key reforms of liberalization have produced rapid growth in national energy supply largely through the development of assets owned and invested by local government and private (and even at times foreign) firms. These firms often enjoy higher productivity and profit rates than their central state firm counterparts and respond quickly to rapid increases in energy demand.

However, despite these advantages and the critical role that such firms have played in times of economic boom, the rise of these firms has not incrementally replaced firms owned by the central government in the long-term. In such a way, the central government's ability to *deliver* directly energy supply varies over time, yet its control over the *mechanisms* that determine the type and number of market players (barriers to

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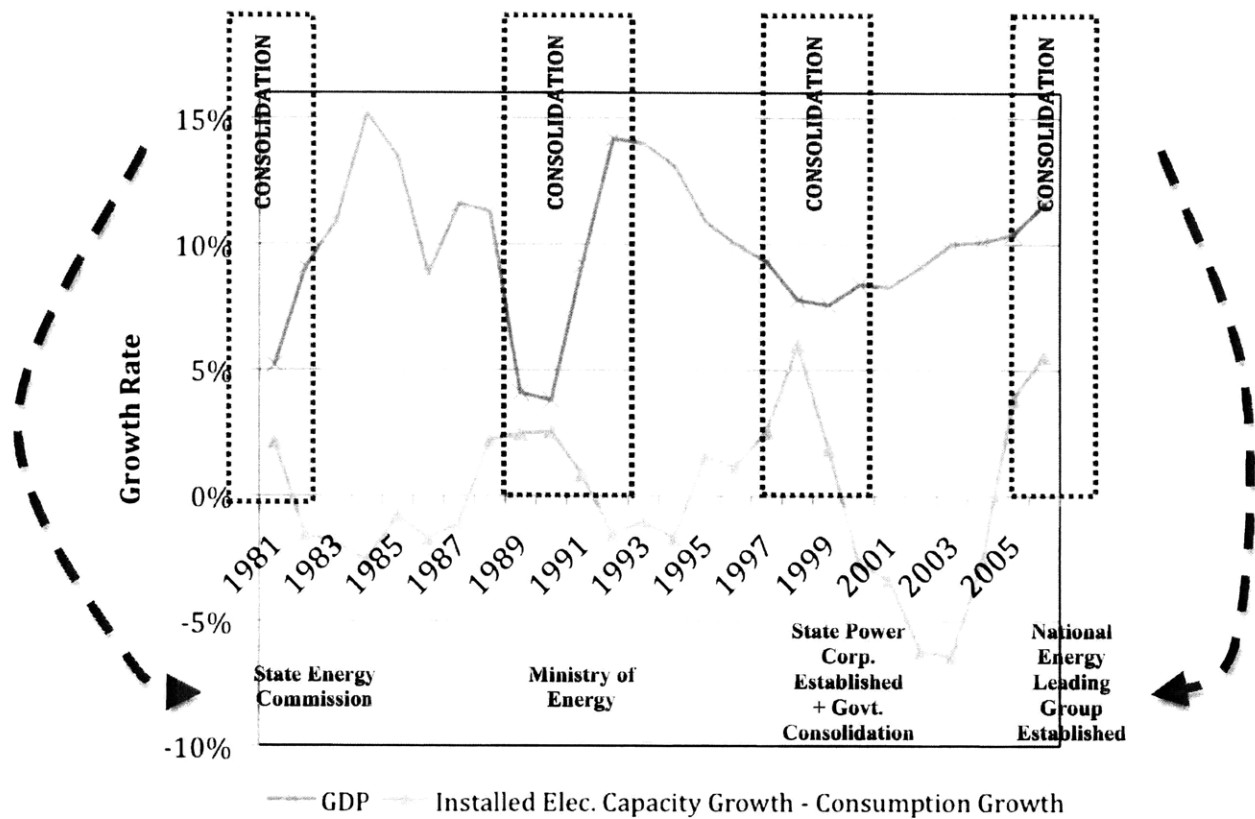
<sup>78</sup> Growth rate of approximately nine percent and above.

entry), the rate of projects (project approval), and type of investment and retail pricing remains largely intact through reform.

*Cycles of Growth, Cycles of Ownership*

The alternating dilution and consolidation of ownership and investment rights corresponds to stresses on China's energy system created by major shifts in economic growth. Historically, soaring economic growth rates, particularly when above nine percent, create energy shortages that elicit purposive central policy actions to devolve energy investment and ownership to local governments and firms. However, these means of a liberal market economy state (the pluralization of ownership and investment) serve goals that are associated with a developmental state (rapid capital agglomeration and industrialization). These policies mobilize diffuse capital, increase energy supply, and diversify sources of investment while also attempting to mitigate high rates of inflation driven by bank lending.

**Figure 4. GDP Growth, Electric Power Balance, and the Centralization of Regulatory Institutions**



Source: NBS, China Statistical Yearbook, multiple years.

However, this diversification of actors also creates powerful local government interest in insulating newfound local ownership in upstream coal and electric power assets from incumbent, central government-owned state-owned enterprise (SOE) acquisitions and consolidation. Under these conditions, political energy decisions based on local cross-shareholding between local government and firm actors strengthen. High economic growth rates tend to render resulting inefficiencies invisible to the central government, as energy shortage creates a seller's market and all energy is purchased regardless of the seller's identity.

When energy demand slackens however, the vested interests created by fragmented local energy structures are exposed. These local energy industries are then subsequently targeted for consolidation by central government entities, themselves often re-centralizing institutionally during such periods of retrenchment. The central state attempts to invigorate slowing economic growth through major central state-led energy projects and raised bank lending. Writing in particular about the electric power generation industry, Chi Zhang and Thomas Heller noted this pattern, arguing that “[D]uring the period of surplus supply, political controversies sprang up over which plants would be dispatched; the central government used these controversies to reassert authority and also to initiate planning for further organization reform.”<sup>79</sup> Incumbent SOEs are then supported in their drive to consolidate the industry through direct acquisition or more indirectly through central government renegotiation of contracts, delay of approvals, tariff policy changes, or the enforcement of long-standing safety regulations or environmental standards. Renewed high economic growth creates pressures for new rounds of fragmentation to address resulting energy shortages.

At the national level of analysis, the resulting character of China’s energy governance apparatus over time is one of periodic fragmentation. This fragmentation is also reflected at the industry level of analysis, in the market structure of China’s largest energy industries: coal and electric power generation. Many have rightfully criticized this structure of both state and market in the energy sector, citing it to explain China’s poor environmental governance, less than ideal utilization of capital, and other legitimate

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<sup>79</sup> Chi Zhang and Thomas Heller, “Reform of Chinese electric power market: economics and institutions,” in David Victor and Thomas Heller (ed.), *The Political Economy of Power Sector Reform: The Experiences of Five Major Developing Countries* (Cambridge: Cambridge University, 2007), p. 77.

challenges the sector faces.<sup>80</sup> However, such criticism neglects to recognize a more central fact: it is precisely this periodic fragmentation at the levels of government and industry that have enabled China to meet the majority of its energy needs. Moreover, such periodic fragmentation provides evidence of a central state able to exit and to enter this sector over time despite significant liberalization measures that seemingly strengthened the market, and despite the creation of major local government and corporate interests supporting continued fragmentation of this market.

Central policymakers reacted to major swings in economic growth with familiar cycles of diversification and consolidation that are evident in the industrial structure of China's energy industries. The approach recognized the limitations of central governance administrative and financial capacity – the capacity to deliver directly infrastructure goods through central state-owned firms – in periods of rapid economic growth and ceded these functions to sub-central governments and the corporate actors created by reform. However, the central government's capacity to determine which players would participate in the market, which contract terms would be re-negotiable, and the relative pricing between segments of the supply chain remained in place through time. Fluctuations of this cycle are evident in all industries of the energy sector, and while devolution proved to be fitful in the concentrated oil and gas sector, it is evident for longer periods in the industries that provide the majority of China's energy supply: coal and electricity generation.

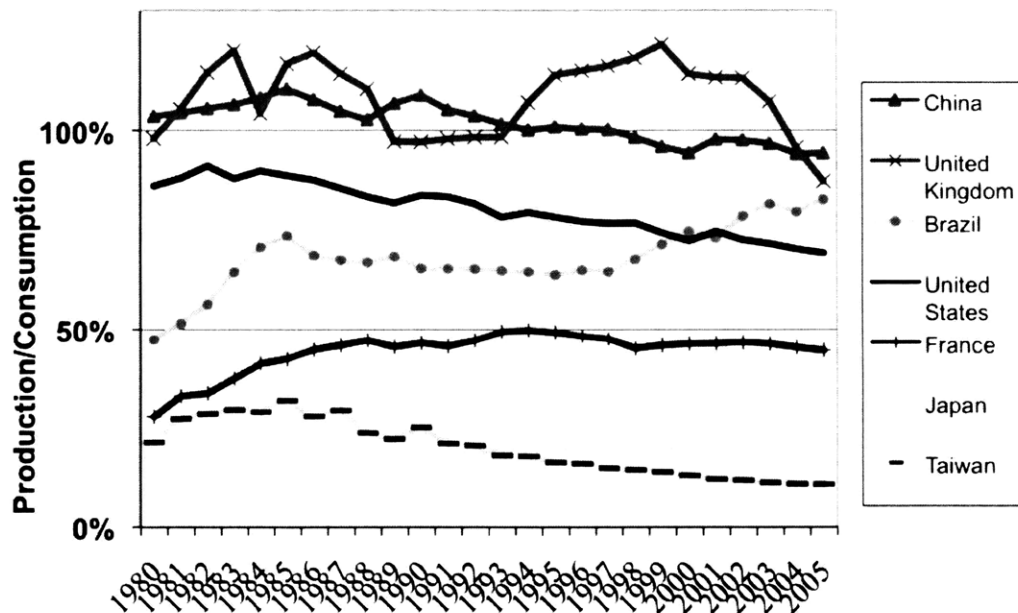
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<sup>80</sup> For persuasive examples see: Philip Andrews-Speed 2004; Erica Downs, "Energy Security Series: China," *The Brookings Foreign Policy Studies* (2006); Joanna Lewis, "China's Strategic Priorities in International Climate Change Negotiations," *Washington Quarterly* 31, no. 1 (December 1, 2007): 155-174.

Meeting Demand

In 2005 China replaced the US as the world's largest primary energy producer, a position the US had enjoyed for nearly a century.<sup>81</sup> In that same year, China managed to provide over 94 percent of its primary energy demand domestically, ranking it among the world's most energy self-sufficient economies. As Figure Five illustrates, this ratio is high in comparison to the US (at 71 percent), to large developing countries in the region (such as India at 72 percent), and to large developed countries in the region (such as Japan at 18 percent). This level of self-sufficiency is also remarkable, given the Chinese state's historical lack of capital, splintered government institutions, and rapid economic growth during the past three decades of reform.

**Figure 5. Comparative Primary Energy Self-Sufficiency Ratios**



Source: British Petroleum, Statistical Review of World Energy, 2008.

<sup>81</sup> These figures have been normalized, and measured in million tons of oil equivalent (Mtoe). See The Economist, *Pocket in World Figures 2009* (London: Profile Books, 2009), p.56.

The growth of China's energy system has depended primarily on major capacity increases in coal and electric power production. In 2006 the coal sector accounted for over 75 percent of China's primary energy production, and over 80 percent of electric power production.<sup>82</sup> Such an increase in turn depended on the granting of investment and ownership rights to firms and authorities at the provincial and local levels.<sup>83</sup> This process occurred in both of these key industries during periods of high economic growth and relative energy shortage. In the case of the coal industry, collectively owned mines at the township and village level served as a form of "shock absorber" when rapid economic growth led to stress on national energy supplies. These mines grew from providing nine percent of the 354 million tons of coal produced in 1970 to 46 percent of the 1.30 billion tons produced in 1995 and then declined to 31 percent of the 1.42 billion tons produced in 2002.<sup>84</sup> By 2006 the production of local collective mines equaled about three-quarters of total US production that year.

In electricity generation, power plants owned and financed by provincial and municipal governments, foreign firms, and private domestic firms served a similar purpose. These plants grew from providing zero percent of the 23.8 GW of generating capacity in 1970 to 57 percent of the 718.9 GW capacity in 2007. Such size is considerable, both in domestic and international comparative terms. This capacity is equal to about three times the national generating capacity of India or four times that of

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<sup>82</sup> LBNL, China Energy Databook 2008. Percentages calculated based on normalized million tons of coal equivalent (Mtce) figures.

<sup>83</sup> For more on devolution and delegation as the foundation of decentralization reforms, see G. Shabbir Cheema and Dennis A. Rondinelli, *From Government Decentralization to Decentralized Governance* (Washington: Brookings Institution, 2007); Dennis A. Rondinelli, John R. Nellis, and G. Shabbir Cheema, "Decentralization in Developing Countries A Review of Recent Experience" World Bank Staff Working Papers, No. 581, Management and Development Series (Washington: World bank, 1983); and James Manor, "The Political Economy of Decentralization" World Bank Draft Paper, August 1, 1997.

<sup>84</sup> LBNL, China Energy Databook 2008. These figures have not been adjusted to account for unreported coal production.

the United Kingdom in that year. It was also equal to the size of China's entire national generating capacity in 2003, only four years earlier. As discussed later in this chapter, foreign invested power plants were first utilized as "shock absorbers" analogous to the role of local non-state mines in coal. Foreign investment rose rapidly in the early 1990s with economic growth rates between nine and 10 percent, then was systematically eliminated through term renegotiations later in the decade once energy shortages eased. Local electric power firms have also experienced such consolidation, as discussed in detail through the two case studies. As Figure Six illustrates, despite intermittent coal and electric power bottlenecks over the years, China has successfully met the majority of its domestic needs for electric power and has served as a major net exporter of coal in the past. Levels of domestic primary energy production have largely met levels of domestic primary consumption over time, as seen in Figure Five, in contrast to the experience of the US or India.

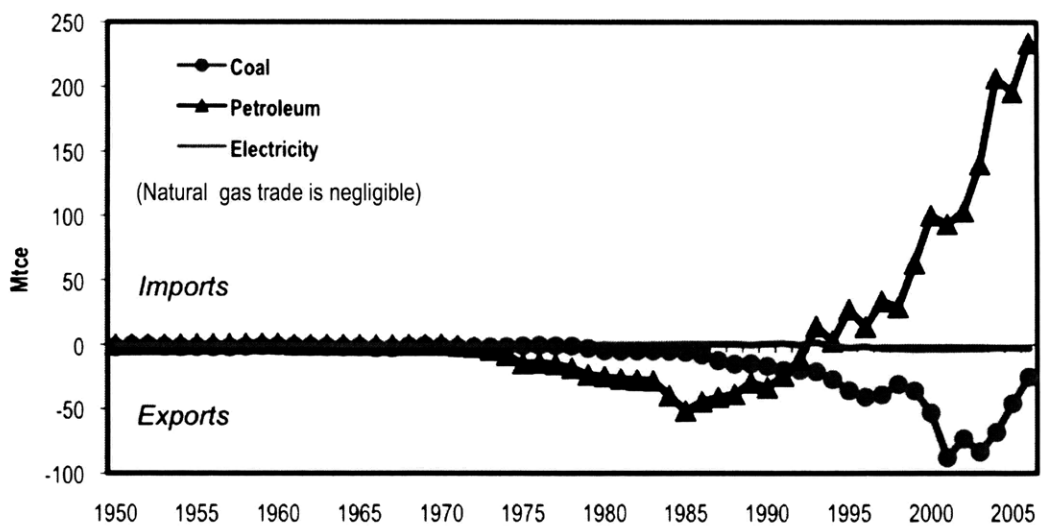
The pluralization of finance, ownership, and delegation of responsibilities to build energy production capacity in part solved immediate fiscal challenges for the central government that first emerged in the post-Mao period during the early 1980s, when economic growth began to accelerate.<sup>85</sup> These local firms in coal and (local and foreign firms) in electric power also served as a source of system flexibility when energy demand later fluctuated, such as in the late 1980s and early 1990s following Tiananmen. During such periods these firms were either shuttered, despite their competitive cost structure, or, as was frequently the case, allowed to be acquired by eager incumbent central state-

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<sup>85</sup> See Victor Shih, *Factions and finance in China: elite conflict and inflation* (Cambridge: Cambridge University Press, 2007).

owned SOEs.<sup>86</sup> Understanding such structural change in China's coal and electric power industries and the related capacity of the central government in shaping such structure requires an understanding of cycles of institutional change within the central government's energy-related entities over time.

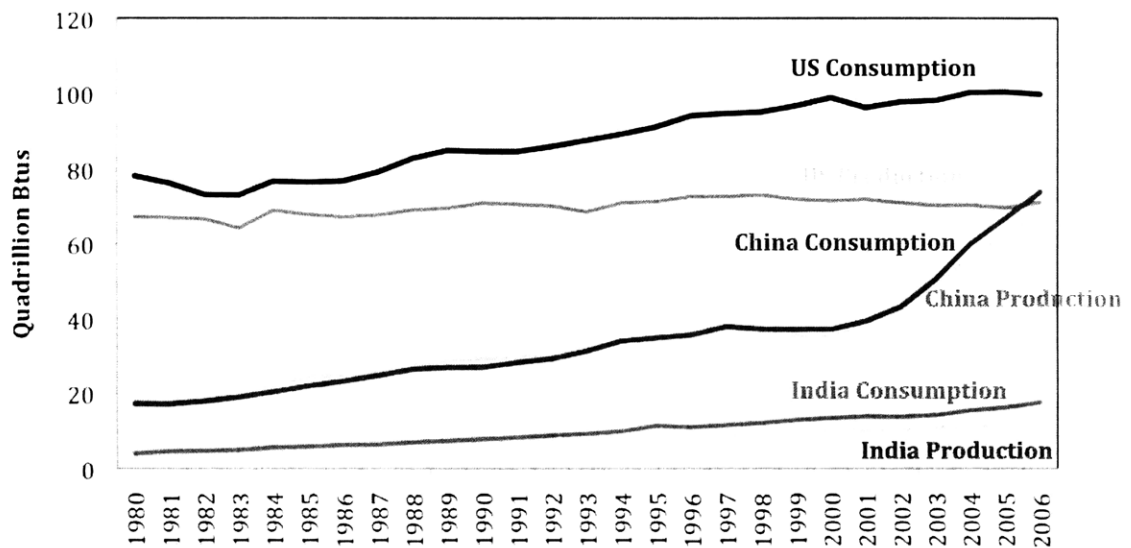
**Figure 6. Net Trade in Petroleum, Coal, and Electricity**



Source: LBNL, China Energy Databook, 2008.

<sup>86</sup> Philip Andrews-Speed et al., "A Framework for policy formulation for small-scale mines: the case of coal in China," *Natural Resources Forum*, vol. 26 (Blackwell Synergy, 2002), p. 45-54.

**Figure 7. Primary Energy Production and Consumption**



Source: IEA, 2008.

*The Wizard, Revealed – Who is Regulating?*

This chapter begins with an institutional review of energy governance in China that illustrates the cyclical relationship between economic growth rates and the structure of China’s energy governance over time. The discussion then turns to the ways in which the industrial organization of the electric power and coal industries evolved as a result of such interaction.

*Repeated Attempts at Administrative Centralization (1953-1982)*

The 2008 creation of a National Energy Commission is the latest in a long line of institutional centralization efforts in the history of China’s energy governance, and precedent suggests that the lifetime of such an institution may be quite short. China’s regulatory entities have been and continue to be characterized by overlapping

jurisdictions and waves of centralization and decentralization.<sup>87</sup> Tellingly, Beijing's first attempt to centralize energy oversight proved short-lived. Between 1953 and 1955, the newly founded central government created the Ministry of Fossil Fuels (MFF) to combine the coal, electricity and petroleum industries into one entity for energy policymaking, allocation, planning and development. By 1955 the need for management specialization and heightened annual growth of energy demand from six percent to over 15 percent quickly led to the abolishment of the MFF and the formation of separate ministries for coal and petroleum.

A second administrative consolidation trend emerged in 1960, when the disastrous results of the Great Leap Forward and the withdrawal of Soviet advisers led to economic growth plummeting from slightly under nine percent the previous year to negative 0.3 percent. Coordination was strengthened among the Ministry of Electric Power (MOEP), Ministry of Coal Industry (MCI) and Ministry of Petroleum Industry (MPI) while reduced demand required the shuttering of many plants and refineries. This consolidation then moderated with the decentralization trends unleashed by the Cultural Revolution mid-decade. The markedly lower growth rates of 1971-1972, when the economy grew at a mere four percent, coincided with a partial re-consolidation effort whereby the MOEP and the Ministry of Water Resources Utilization were combined to form the Ministry of Water Resources and Electric Power, and the Ministry of Petroleum Industry merged with the Coal and Chemical ministries to form the Ministry of Fuels and Chemicals.

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<sup>87</sup> This section is a more detailed treatment of a summarized argument in Edward Cunningham, "China's Energy Governance: Perception and Reality", MIT Center for International Studies Audit of the Conventional Wisdom, (March 2007). For a more detailed early institutional review of electric power reform, please refer to E. J. W. van Sambeek, "Institutional Framework of the Chinese Power Sector", ECN Policy Studies, October 2001.

By the middle of 1980 the economy's growth rate began to drop again, leading to five percent growth the following year, and the central government launched a third wave of attempted administrative centralization that led to the creation of the State Energy Commission (SEC), which, however, never received dedicated staff, an independent base of operations, or funding, and whose creation qualified 'as one of the major non-events of 1980'.<sup>88</sup> Previously existing agencies continued to operate as before, and the commission dissolved two years later amid nine to 10 percent economic growth rates and a proven inability to raise the capital necessary to support sufficient power generation for the burgeoning national economy. As Victor Shih has noted: "The planners' tight grip on the economy was first loosened when growth far exceeded the plan in 1982 and in 1983. Deng responded by sending a series of political signals to members of his factions in the provinces to increase investment and to take their own initiatives".<sup>89</sup> Shih also argues that in early 1984 the economic figures from 1983 revealed "continual economic vigor and a thirst for capital from the grassroots level...[and] in late April 1984...the Meeting for Some Coastal Cities...had a strong agenda to devolve investment and lending power to the localities."<sup>90</sup> The growth of the early 1980s provided an opportunity for the new, reform-oriented leadership to begin the process of removing government from commercial enterprise work and the business of controlling energy production.

#### *Decentralization I: Rise of Corporations (1982-1998)*

The need for capital and technology acquisition, most immediately for the electric power generation necessary to the industrial growth that China's reformers were

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<sup>88</sup> Thomas Fingar, "Implementing Energy Policy: The Rise and Demise of the State Energy Commission", in David Lampton (ed.) *Policy Implementation in Post-Mao China*, (Berkeley: Univ. of California Press), 1987, p.207.

<sup>89</sup> Shih, p.110.

<sup>90</sup> *Ibid.*, p.114-5.

encouraging, led to 1986 policy changes that allowed the entrance of new investors upstream into coal, electric power and oil production. Provincial, municipal, and local governments, as well as private domestic and foreign firms were encouraged to invest in coal mines, power plants, and a range of oil refining and production activities. In order to facilitate this step-change in energy production, energy assets were also corporatized. During this decade major energy firms were established such as China National Petroleum (Group) Corporation (CNPC), China Petrochemical (Group) Corporation (Sinopec) and China National Offshore Oil Corporation (CNOOC) in the oil industry as well as Huaneng Group in electricity generation. In 1988 the ministries of Petroleum, Water Conservancy and Power, and Coal Industries were abolished, and many of their regulatory responsibilities were transferred to the new corporations. This devolution of power occurred despite the strengthening of conservative factions at the elite level, leading to the ouster of reform-oriented leader Hu Yaobang as general secretary in 1987.

A Three-Year Austerity Program (1988-1991) was introduced in the fall of 1988 “in an effort to cool the nation’s overheated economy”.<sup>91</sup> As James Dorian has written, “soaring inflation, corruption, and a general economic slowdown” resulted in the formulation of the Program, which “outlined tough measures to revive state controls, curtail spending, and reduce imports of consumer goods.”<sup>92</sup> The plan “urged recentralization of control over trade and producing enterprises in China as a means of enhancing the state’s role in guiding the economy”.<sup>93</sup> While this recentralization was partly supported by shifts in elite politics that undermined pro-reform leaders such as Hu

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<sup>91</sup> James Dorian, *Minerals, Energy, and Economic Development in China* (Oxford: Oxford University Press, 1994), p.80.

<sup>92</sup> *Ibid.*, p.75.

<sup>93</sup> *Ibid.*

Yaobang, these changes in 1987-1988, as Joe Fewsmith writes, did “not fit into the category of a struggle to win all or lose all”, and are therefore best classified as “struggles in which a political leader loses power but which do not result in a major change of political direction”.<sup>94</sup>

As economic growth began to drop, dipping to four percent and below by the following year, the Ministry of Energy (MOE) was launched in June of 1988, and was designed as a fourth attempt to provide central oversight over the newly complex set of actors in the energy sector. The ministry was the result of a consolidation of the former ministries of coal, petroleum and nuclear industries, as well as the electric power assets of the Ministry of Water Resources and Electric Power. As Dorian argues, the ministry was designed to provide oversight over two sets of actors: the seven core newly emerged corporations providing energy products to the market, and the administrative departments managing functional areas such as technology transfer, investment, financing, and personnel management.<sup>95</sup> However, the MOE never integrated well with the much more powerful State Planning Commission (SPC). This gap in coordination was perhaps best illustrated in the major disparity between energy demand estimates that the SPC and MOE calculated for the Eighth Five-year Plan. The 1991 SPC estimate for total required electric power build-out for the 1991-1995 period equalled 83.6 GW, only 70 percent of the 121.7 GW estimate of the MOE.<sup>96</sup> This new ‘supra-ministry’ of energy soon followed in the footsteps of its predecessors, however, suffering from internal competition and dissension, and was disbanded less than five years later, in March 1993. As one scholar wrote: “Unfortunately, the MOE was little more than a collection of the

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<sup>94</sup> Joseph Fewsmith, *Elite Politics in Contemporary China*, (Armonk: ME Sharpe, 2001), pp.xxvi, xxvii

<sup>95</sup> Dorian, p.114.

<sup>96</sup> Xiaoqian Zhou (ed.) *Zhongguo dianli gongye guihua*, (Beijing: Water Power Publishing, 2007), p.117

same vested interests within one umbrella organization, the same personnel, the same allegiance, and the same entrenched interests...the MOE was never able to function as a cohesive group.”<sup>97</sup>

The creation of energy corporations in the mid-1980s marked an important break from past governance patterns, and represented a new model of both interacting with the rapidly evolving global energy market outside China’s borders and also attracting the financing and technology necessary to harness the energy potential within the country. This dual need was articulated in numerous official documents, including a September 10, 1993 MOEP instruction:

“...foreign investment in the nation’s electric power industry not only supplements inadequate domestic construction funds and ability to manufacture power generating equipment, moreover the technology and management experiences that foreign investment will bring, as well as the economic efficiency created, will be good...in the past 10 years alone foreign investment constitutes 11 percent of electric power construction investment.”<sup>98</sup>

By the early 1990s annual domestic production capacity was estimated to be between 9 and 12.5 GW while annual expansion goals equalled 14.6-23.5 GW.<sup>99</sup> A 1994 MOEP plan reiterates this need: “China can fulfil about three-quarters of the new business [which includes rehabilitation programs for existing plants] internally, leaving \$25 billion for foreign suppliers; such help will be welcomed, provided it is accompanied by foreign finance”.<sup>100</sup> The emergence of corporations also marked a critical step in the

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<sup>97</sup> Daniel Chow, “An Analysis of the Political Economy of China’s Enterprise Conglomerates: A Study of the Reform of the Electric Power Industry in China.” *Law and Policy in International Business* 28(2) (1997), p. 406.

<sup>98</sup> MOEP document no. 341, “Expanding the Scale and Use of Foreign Investment to Accelerate Electric Power Development”, September 10, 1993. In Xiaoqian Zhou (ed.) *Zhongguo dianli gongye guihua*, (Beijing: Shuidian chubanshe, 2007), p.826.

<sup>99</sup> Allen Blackman and Xun Wu, “Foreign direct investment in China’s power sector: trends, benefits and barriers,” *Energy Policy* 27, no. 12 (1999), p. 699.

<sup>100</sup> Pei-Yee Woo, “China’s Electric Power Market: The Rise and Fall of IPPs”, (PESD Working Paper No.45), August 16, 2005. p.11.

'marketization' of China's infrastructure. As one scholar has noted, corporate involvement "fundamentally changed expectations about electricity – power was now regarded as a commodity to be bought and sold on the market, rather than allocated by government".<sup>101</sup>

In addition, the corporation emerged in part as a means of organizing productive assets and property rights. The proliferating government entities discussed above claimed ownership over financial stakes in SOEs that overlapped and that were often illegitimate and at odds with one another. The logic of corporatization<sup>102</sup> stemmed from "its ability to specify ownership rights and to legally separate enterprise from state administration".<sup>103</sup> The "Company Law", which was passed on December 29, 1993, served as the primary legal framework to identify claims over liabilities and assets of the rapidly diversifying economy, and to regulate formal decision-making powers at the firm level in an effort to insulate firms from political influence. Articles 3 and 4 clearly state that the liability and rights of shareholders of a firm are in proportion to their capital contribution to the firm. Moreover, article 7 explicitly states that SOEs under reorganization to corporation status must "identify and verify" the firm's assets and "determine the respective owners of the property rights therein, and settle its creditor's rights and liabilities".<sup>104</sup> The law therefore provided an opportunity both to re-evaluate the nest of outstanding claims against many

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<sup>101</sup> Yi-Chong Xu, *Powering China: Reforming the Electric power Industry in China*, (Aldershot: Ashgate) 2002. p.126.

<sup>102</sup> Corporatization is defined as the diversification of ownership structure, and in this chapter particular attention is afforded the introduction of sub-central state and of nonstate parties as shareholders "to make SOEs operate as if they were private firms facing a competitive market or, if monopolies, efficient regulation". (Mary Shirley, "Bureaucrats in business: the roles of privatization versus corporatization in state-owned enterprise reform," *World Development* 27, no. 1 (1999), p. 115). See also Colin Xu, Tian Zhu, and Yi-min Lin, "Politician control, agency problems and ownership reform: Evidence from China," *Economics of Transition* 13, no. 1 (2005): 1-24.

<sup>103</sup> Xu 2002, p.100.

<sup>104</sup> See <[www.cclaw.net/download/companylaw.asp](http://www.cclaw.net/download/companylaw.asp)>.

SOEs in the energy sector and at least to begin the process of removing party political actors from the daily management of firms.

By the mid-1990s and the return of rapid economic growth, averaging 13.1 percent between 1992 and 1995, the central administration of the energy sector was again performed by disparate entities, many of which had been reinstated, as well as the rising energy corporations that were increasingly straddling commercial and regulatory functions. This array of government actors included, but was not limited to, the State Development and Planning Commission (SDPC), the State Economic and Trade Commission (SETC), the Ministry of Petroleum Industry, the Ministry of Geology and Mineral Resources, the Ministry of Electric Power, the Ministry of Land and Natural Resources, and the Ministry of Coal Industry. In 1998, as part of a government-wide restructuring of industrial policy in the ‘pillar industries’ of energy, transportation, and telecommunications, the Ministry of Coal Industry and Ministry of Electric Power Industry (MEPI) were abolished and the State Administration of Coal Industry (SACI) was formed under the SETC, granting provincial governments operational management over coal mining enterprises and larger scale electric power projects. Much of the operational authority for the electricity industry was transferred to the newly established State Power Corporation of China (SPCC).

#### *Decentralization II: Rise of Multiple Agencies (1998-2008)*

By 1998 rapid corporatization and slowing growth by late 1997 and into 1998 (in part due to the Asian Financial Crisis), led to a major set of industrial and institutional reforms that sought to consolidate central government capacity in the form of personnel, dedicated funding and institutional structure. Quarterly export growth rates, year-on-year,

declined from above eight percent in the first quarter of 1997 to near zero percent in the first quarter of 1999. Corresponding figures for electric power generation match this movement, declining from five percent in the first quarter of 1997 to near zero percent by the second quarter of 1998.<sup>105</sup> Despite the mobilization of corporate resources, the central state did not initially redeploy its resources to guide energy investments at the firm level.

Philip Andrews-Speed captures this process well, observing:

'[i]n the past, the leaders of the major state-owned energy companies were able to play a major role in determining the policies and plans for their individual industries. Progressive corporatization of these companies has reduced the power of these executives to influence national policy to a great extent, but the capacity of government to lead has not been enhanced in a commensurate way. Indeed, with more players in the sector, the government's ability to manage the energy sector has actually diminished.'<sup>106</sup>

Barry Naughton has also recognizes the migration of energy decisions to the firm level, writing:

'Particularly following the revival of state sector profitability, some of these organizations are extremely rich and powerful. The state companies under central SASAC's [State-owned Asset and Supervision and Administration Commission] purview include, for example, the State Electricity Grid and the big electric power-generation companies...This middle layer of the state economy is the least transparent...in between the fully corporatized and often listed companies, and the national government.'<sup>107</sup>

In March of 1998 the NPC approved a wide-ranging plan to consolidate the central government apparatus and state-owned industry structure. The 40 ministries overseeing China's growth were reduced to 29, with many employees transferred to SOEs, research institutes, quasi-private firms, or simply laid off. The reforms affected over 33,000 central government personnel and within two years had laid off more than 4 million

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<sup>105</sup> NBS, China Economic Yearbook, multiple years; Pei-Yee Woo, "China's Electric Power Market: The Rise and Fall of IPPs", (PESD Working Paper No.45), August 16, 2005. p.6.

<sup>106</sup> Philip Andrews-Speed, "China's energy woes: running on empty", *Far Eastern Economic Review*, June 2005, p.17.

<sup>107</sup> Barry Naughton, "Claiming profit for the State: SASAC and the capital management budget", *China Leadership Monitor*, vol. 18, Spring 2006, p.4. [www.media.hoover.org/documents/clm18\\_bn.pdf](http://www.media.hoover.org/documents/clm18_bn.pdf).

government employees.<sup>108</sup> In the energy sector, power struggles between the SDPC and the SETC ensued, and by February 2001 the SACI and coal, power, and other administrations under the SETC were closed, as were most of their provincial, prefectural, and county counterparts. In March 2003, the SETC itself was abolished and the majority of its functions transferred to the SDPC, subsequently renamed the National Development and Reform Commission (NDRC). Immediately prior to this major realignment, the nation's first independent regulator for the power industry was established: the State Electricity Regulatory Commission (SERC). The emergence of this unprecedented, arm's-length body heralded what many scholars have termed a new era of the 'regulatory state' in energy.<sup>109</sup> Others, such as Margaret Pearson, argue that such restructuring is another attempt to strengthen state control but continues to be plagued by historical institutional fragmentation. She writes: "the most recent round of bureaucratic restructuring in March 2003 strengthened the state's efforts to maintain authority over strategic assets".<sup>110</sup>

The migration of significant financial decision-making authority to energy firms was part of an economy-wide breakup and reconsolidation of the central state's existing institutions during this period of slowed economic growth. However, while some degree of consolidation under the NDRC did take place by the early 2000s, a range of new

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<sup>108</sup> Luo Gan, "Explanation of Plan for Institutional Restructuring of the State Council", *Ta Kung Pao*, March 7, 1998 (in FBIS, DR/CHI, March 10, 1998, 98-068); Cheng Li, "China in 1999: Seeking Common Ground at a Time of Tension and Conflict", *Asian Survey*, 40:1 (2000), p.122. For related WTO accession issues please see Joseph Fewsmith, "China and the WTO: The Politics Behind the Agreement," National Bureau of Research (NBR) Analysis 10:5, Essay 2 (November 1999).

<sup>109</sup> For representative work supporting this perspective, see Dali Yang, *Remaking the Chinese Leviathan: Market transition and the politics of governance in China* (Stanford University Press, 2005).

<sup>110</sup> Margaret Pearson "The Business of Governing Business in China: Institutions and Norms of the Emerging Regulatory State", *World Politics*, vol.57 (January 2005), p. 304-5. See also Margaret Pearson, "Governing the Chinese Economy: Regulatory Reform in the Service of the State," *Public Administration Review* 67, no. 4 (2007): 718-730.

entities, like SERC, began to proliferate and link regulatory activities to the energy sector. At the central level, the State-owned Assets Supervision and Administration Commission (SASAC), established in 2003, claims nominal ownership rights over, and bears responsibility for, the management and disposal of certain state-owned assets (including merger and acquisition approval and other energy asset restructuring). The commission also has input into personnel movements concerning individuals of vice-ministerial rank and below. The State Environmental Protection Agency (SEPA) was raised to ministerial rank to become the Ministry of Environmental Protection (MEP), and enforces environmental standards and compliance by energy firms, while resource extraction rights, operation management, and conflict resolution responsibilities are largely shared by the Ministry of Land and Resources (MOLAR), the Ministry of Water Resources (MWR), and the State Administration of Coal Mine Safety (SACMS). The interests of these entities, of course, do not always align. SERC and the pricing bureau of the NDRC seek to strengthen competition by maintaining higher numbers of energy firms in industries such as power generation. In contrast, other central agencies, such as SASAC, aim to maximize returns on assets by encouraging the consolidation of existing firms.

While the shape of China's institutional landscape in the energy sector was certainly influenced by the larger top-down transformation of central government and the pluralization of regulatory actors in the national economy, energy investment and project approval authority remained centralized. The State Economic Commission, in charge of annual energy production and consumption management, was dismantled in 1988, yet its short-term project approval and investment approval authorities were transferred to the

Production Office under the State Council. This office was then enlarged in 1992 to become the State Economic and Trade Commission (SETC), eventually headed by future premier Zhu Rongji, to oversee the short-term macroeconomic management of national economy and trade developments. Construction and investment approval for major projects (in most cases above \$10 million) and long-term projects throughout this period remained under the purview of the NDRC. The SETC was charged with annual industrial policy, enterprise management and the development of large corporations, and its 20 offices and 10 administrations included energy-specific entities, namely the Department of Investment and Planning, Department of Electric Power, State Administration of Coal Industry, and the State Administration of Petroleum and Chemical Industries. By March 2003 the SETC was folded into the NDRC, consolidating short-term and long-term investment and construction approval into one central government entity.

### *China's Energy Structure*

The following section will address the market structure of China's oil and gas, coal, and electric power industries in an effort to illustrate the significant differences between the concentrated oil and gas industry on the one hand and fragmented coal and electric power industries on the other. While much of the relevant literature is concerned with reforms in the Chinese oil and gas industry and the rise of such firms, the vast bulk of national energy production relies on coal and electric power – markets frequently as fragmented as the authorities attempting to regulate them.

## *Oil and Gas*

Scholarly and political analyses of China's energy system often focus primarily on the oil and gas industry, motivated by: i) the perceived strategic nature of these hydrocarbons; ii) China's relatively recent emergence as a net oil product importer and net crude oil importer in 1993 and 1996 respectively; and iii) the increasingly global investment activities of Chinese oil and gas firms beginning in the late 1990s.<sup>111</sup> This attention has reinforced the view that China's energy sector is heavily concentrated and dominated by a handful of large incumbent firms, financed largely by the central government, and therefore resistant to major change, institutional or otherwise.<sup>112</sup> Unlike analyses of the private or quasi-private sector in China, which frame state involvement as a largely "helping hand" model of development<sup>113</sup>, analysis of the energy sector often characterizes Beijing as an interventionist state actor pursuing regressive pricing and finance policies.<sup>114</sup> These perspectives argue that barriers to market entry for non-

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<sup>111</sup> David Zweig and Jianhai Bi, "China's Global Hunt for Energy," *Foreign Affairs* 84, no. 5 (2005); Kenneth Lieberthal and Mikal Herberg, "China's Search for Energy Security: Implications for US Policy" (National Bureau of Asian Research, 2006); Daojiong Zha, "China's energy security: Domestic and international issues," *Survival* 48, no. 1 (2006): 179-190. Notable recent exceptions include Peter Nolan and Huaichuan Rui, "Industrial Policy and Global Big Business Revolution: the Case of the Chinese Coal Industry," *Journal of Chinese Economic & Business Studies* 2, no. 2 (May 2004): 97-113; the many writings of Philip Andrews-Speed; and Elspeth Thomson, *The Chinese Coal Industry: An Economic History* (Routledge, 2003).

<sup>112</sup> Peter Nolan and J. Zhang, "Globalization Challenge for Large Firms from Developing Countries: China's Oil and Aerospace Industries," *European Management Journal* 21, no. 3 (2003): 285-299.

<sup>113</sup> Timothy Frye and Andrei Shleifer, *The Invisible Hand and the Grabbing Hand* (Cambridge, MA: National Bureau of Economic Research, 1996); Andrew Walder, "Zouping in Perspective", in Andrew G. Walder (ed.), *Zouping in Transition: The Process of Reform in Rural North China* (Cambridge, Mass.: Harvard University Press, 1998, 16-23); Andrew Walder, "Local Governments as Industrial Firms: An Organizational Analysis of China's Transitional Economy," *American Journal of Sociology* 101, no. 2 (1995); Jean Oi, *Rural China Takes Off: Institutional Foundations of Economic Reform* (University of California Press, 1999. For an overview of varying approaches to the role of the local state in economic development see Tony Saich, "The Blind Man and the Elephant: Analyzing the Local State in China," in Luigi Tomba (ed.), *On the Roots of Growth and Crisis: Capitalism, State and Society in East Asia*, (Annale Feltrinelli, 2002), pp. 75-99.

<sup>114</sup> For example Amy Jaffe et. al., "Beijing's oil diplomacy," *Survival* 44, no. 1 (2002): 115-134; Robert Ebel, *China's Energy Future: The Middle Kingdom Seeks Its Place in the Sun* (Center for Strategic &

incumbent firms are high, incentives to support protectionism by incumbent firms are many, financial resources for non-central state actors are limited, and political pressure to subsidize prices dominates the political economy landscape.

This analytical framework is influential and its implications significant, because it implies that forces for change – in regulation, finance, or ownership – are greatly weakened in China’s energy sector. Indeed, much of the data culled from sub-sectors that are most exposed to international markets (and therefore most “visible” to international observers) support this characterization. The oil and natural gas industries have remained cartelized in structure despite the introduction of significant institutional reforms in the late 1990s and various reforms related to WTO compliance in the early 2000s. China’s three major oil and gas firms traditionally functioned as separate segments of the supply chain. CNPC was created in 1988 to manage China’s oil and gas exploration and production onshore, both domestically and internationally. Sinopec was established in 1983 to build and operate China’s refining capacity downstream and petrochemical production. CNOOC was created in 1982 to specialize in the exploration, development, and production of oil and gas in China's territorial waters (with a depth over five meters).

However, this corporate separation of upstream exploration and production of crude from downstream refining of product proved difficult to maintain once upstream price reforms were designed to stimulate production. Partial liberalization of crude oil prices by the mid-1980s through the mid-1990s rendered CNPC’s onshore exploration and production activities upstream increasingly profitable. Such liberalization did not occur

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International Studies, 2005); L. Jakobson and Daojiong Zha, “China and the Worldwide Search for Oil Security,” *Asia-Pacific Review* 13, no. 2 (2006): 60-73.

downstream in the oil product market. Heavily regulated downstream retail prices for oil products such as diesel and gasoline increased losses for the refining activities of Sinopec. For example, in 1983 the central government introduced a three track pricing system. A fixed annual quota of output was determined, and over two-thirds of that output was sold at a first, low price of RMB100/ton (\$5.60/ton), while over one-quarter was sold at a second, higher price of RMB555/ton (\$31.00/ton). Above-quota production (six percent of total production that year) could be sold at a negotiated price on the market. The low price was abolished by 1993, at which time over two-thirds of crude oil was sold at negotiated prices. In refining, foreign companies had begun to enter oil storage, product importation, and third-party processing, as well as provincial and local companies.<sup>115</sup>

Rising imports in 1993 (leading to China's switch to net importer status of oil product) led to a focus on managing oil consumption and by 1994 the oil pricing market was dismantled. All crude and product prices returned to being fixed by the central government. In April all import rights were abolished. As Andrews-Speed writes: "Thus, having introduced an oil-pricing system which was evolving rapidly towards being an open market, the government has made a rapid retreat. Prices are now tightly controlled and respond only sluggishly to the international markets...In one step the government reversed ten years of reform."<sup>116</sup>

The wide-ranging industrial and governmental reforms introduced during the economic slowdown in 1998 sought to improve the competitiveness of these three firms

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<sup>115</sup> Philip Andrews-Speed, "Reform of China's Energy Sector: Slow Progress to an Uncertain Goal", in Sarah Cook, J. Zhuang, and S. Yao (ed.), *The Chinese Economy Under Transition* (Macmillan, 2000), p.113.

<sup>116</sup> *Ibid.*, p.114, 117.

by vertically integrating them, with particular focus on the two largest (CNPC and Sinopec). After the reforms, Sinopec held both upstream and downstream assets in China's southern and eastern regions while CNPC held upstream and downstream assets in the north and western regions. To deepen commercial reforms and separate regulatory function and corporate management, all three firms listed portions of their assets on foreign exchanges through newly established subsidiary firms.

Yet, despite these considerable attempts to reform the structure of the oil and gas market, much remained the same. Peter Nolan captures this stagnation well, and highlights remaining unresolved questions relating to the continuing influence of the central government in retail pricing, as well as limited competition between firms. He argues that upstream and downstream barriers to entry have remained quite strong, and writes that: "The relationship between the floated company and the parent remains unresolved. While the floated 'children' [subsidiary firms listed on international stock markets], may wish for prosperous independence from their 'parents', the 'parents' (CNPC and Sinopec) have responsibility for a total of 1.5 million employees and several million family members."<sup>117</sup> Nolan concludes that the "Chinese oil and petrochemical industry is still highly protected."<sup>118</sup>

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<sup>117</sup> Peter Nolan, "China and the Global Business Revolution," *Camb. J. Econ.* 26, no. 1 (January 1, 2002), p.125. See also Fereidun Fesharaki and Kang Wu, "Revitalizing China's Petroleum Industry Through Reorganization: Will It Work?," *Oil & Gas Journal* 96, no. 32 (1998).

<sup>118</sup> *Ibid.*, p.126.

**Figure 8. Market Concentration of Energy Sub-Sectors, Post-1998 Reform**

<u>Top Firm</u>	<u>Share of Production in Respective Industry</u>		
	<u>1998</u>	<u>2003</u>	<u>2005</u>
<b>CNPC (Crude Oil)</b>	67.32%	64.50%	58.3%
<b>CNPC (Natural Gas)</b>	70.8%	72.9%	73.5%
<b>Huaneng (Electricity)</b>	2.4%	9.7%	10.4%
<b>Shenhua (Coal)</b>	0.6%	5.1%	8.7% (2006)

*Source:* NBS China Energy Yearbook, various years; NBS China Electricity Yearbook, various years; China Economic Reporting and Monitoring Center (ed.) *Zhongguo chanye ditu – nengyuan 2004-5*, (Beijing: Shehui kexue wenxian chubanshe, 2006) p.49, 134; INNET, China’s Energy Outlook 2004, p.11; LBNL, China Energy Databook 2008; Author’s estimates.

Indeed, a review of oil and gas production figures since the 1998 reforms reveals little significant change in ownership structure. Barriers to significant market entry between upstream and downstream activities have remained high. As Figure Eight illustrates, one firm – CNPC – accounts for over one-half of China’s crude oil production and nearly three-quarters of its natural gas supply. CNPC has actually consolidated its dominance in gas over time and the lack of significant change in the domestic market structure of crude oil is also apparent. Andrews-Speed highlights the continuing obstacles to competition in the industry, arguing: “The issue which does not seem to have been addressed is whether one oil company may invest and conduct exploration, production, refining or distribution in the other’s territory...The longer the period of [regulatory] ambiguity, the stronger the position of the companies. One glaring deficiency in the legal framework is the absence of a petroleum law.”<sup>119</sup> In the US, the five super-majors and a range of smaller firms with revenues above \$20 billion produce slightly more than double

<sup>119</sup> Philip Andrews-Speed, Stephen Dow, and Z. Gao, “The ongoing reforms to China’s government and state sector: the case of the energy industry” *Journal of Contemporary China* (2000), p.15.

the oil China produces and nearly eight times as much natural gas as China.<sup>120</sup> It therefore remains unclear to what extent China's oil market should liberalize to include a higher number of integrated operators to compete with its own three national firms. The more important point is that, given the reform challenges present in China's oil and gas industry, it is understandable how analysis of China's energy market, particularly when viewed through this prism, would support a bias privileging a more monolithic status quo.

#### *Coal and Electric Power*

Despite the concentration of actors in China's oil and gas industry, it is important to note that the term "fragmented authoritarianism", which accurately and persuasively framed the political economy of a reform-era China, emerged first from a study of China's electric power system.<sup>121</sup> Returning to Figure Eight, the coal and electricity statistics reveal these markets to be considerably less concentrated in structure than their crude oil and natural gas counterparts. Shenhua Group, China's leading coal supplier, has only recently topped eight percent of national production. In contrast its American counterpart, Peabody Energy, commands over 20 percent of the US coal market. In 2005 China's top four coal firms produced 16.5 percent of China's coal and the top eight firms produced 24.4 percent. Comparable US figures are 44.8 percent and 59.8 percent.<sup>122</sup> Huaneng Group, the largest power producer in China and until recently led by former Premier Li Peng's son Li Xiaopeng, produces 10.0 percent of national generation.

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<sup>120</sup> Robert Pirog, Congressional Research Services, "Oil Industry Profit Review 2007", CRS Report RL34437, April 4, 2008, p.2.

<sup>121</sup> Kenneth Lieberthal and Michel Oksenberg, "Bureaucratic Politics and Chinese Energy Development" (US Department of Commerce, International Trade Administration, 1986); Kenneth Lieberthal and Michel Oksenberg 1988).

<sup>122</sup> China Economic Reporting and Monitoring Center (ed.) *Zhongguo chanye ditu – nengyuan 2004-5*, (Beijing: Shehui kexue wenxian chubanshe), 2006, p.102.

**Figure 9. Dominance of Coal: Primary Energy Production**

	<u>1976</u>	<u>1986</u>	<u>1996</u>	<u>2006</u>
<b>Coal</b>	<b>68.8%</b>	<b>72.4 %</b>	<b>74.9%</b>	<b>75.7%</b>
<b>Oil and Gas</b>	27.5%	23.3%	18.9%	15.3%
<b>Other</b>	3.7%	4.3%	6.2%	9.0%

*Source:* LBNL, China Energy Databook 2008. Data normalized (EJ) and percentages calculated.

Perhaps most importantly, oil and gas combined contribute only 15 percent of China's national primary energy production. As Figure Nine illustrates, the nation's coal industry forms the backbone of the sector, consistently accounting for three-quarters of China's national primary energy production. However, in contrast to the oil and gas markets, the structure of the coal and electricity industries, upon which China's economic growth is based, have been anything but static.

#### Ownership and Price Reforms

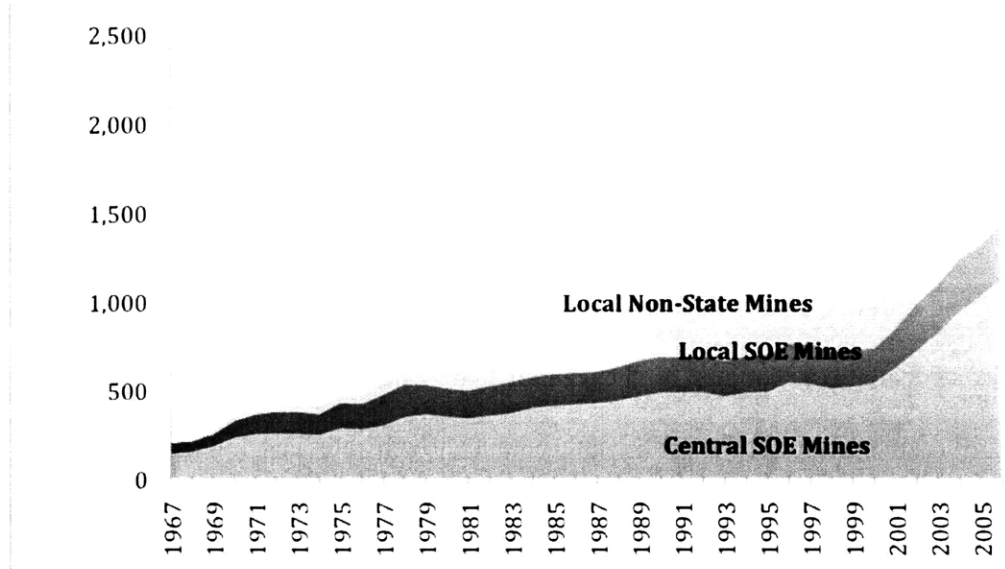
##### *Coal Industry*

Unlike the situation in the oil and gas industries, twin processes of ownership and investment diversification have penetrated extensively upstream, in the coal market. Coal fuels over two-thirds of primary energy consumption in China and dominates the electric power industry, contributing 81.1 percent of total electricity production in 2008.<sup>123</sup> This most vital foundation of China's energy supply has relied significantly on mines owned and operated by firms at the local level, particularly during periods of rapid economic growth. At the outset of the Cultural Revolution in 1966, approximately 80 percent of China's coal was produced by Central State (CS) mines owned and operated by the central government. In the beginning of the reform period in 1978 this ratio had

<sup>123</sup> China Electricity Council, "2008 nian quanguo dianli gongye tongji kuaibao yilambiao", 2009.

been reduced to slightly above 55 percent. By 1995 these central state mines contributed 37 percent of output.

**Figure 10. China's Coal Output by Firm Category<sup>124</sup>**



Source: LBNL, China Energy Databook, 2008.

Much of this variation in ownership over time is the result of limited central state capacity to increase supply through mines administered by the central and local governments during periods of rapid economic growth and resulting energy shortage. This early shortage led to the promulgation of policies that encouraged Local Non-State (LNS) mines to grow to fill the gap in production. Philip Andrews-Speed has noted such disparity, writing:

“Due to the disbanding of the communes beginning in the late 1970s, and the encouragement given to people in rural areas to mine coal, production at LS

<sup>124</sup> Data from 1998-2002 accounts for estimated unreported coal production from LNSM. See Kevin Tu, “Statistical Distortion and Value Chain of the Chinese Coal Industry”, presentation to PESD, Stanford University, February 11, 2009; Jonathan Sinton and David Fridley, “Hot Air and Cold Water: The unexpected fall in China's energy use”, *China Environment Series*, Issue 4, 2001; David Fridley, Jonathan Sinton, and Joanna Lewis, “Working out the Kinks: Understanding the Fall and Rise of Energy Use in China”, *Oxford Energy Forum*, May 2003.

[Local State] and LNS [Local Non-State] mines had continued to rise sharply in the early 1980s, to the extent that in 1986 Shanxi's total output far outstripped the ability of the railways to ship it out of the province to where it was needed. Many of the state mines had to operate well below capacity..."<sup>125</sup>

This cycle is evident in Figures 11 and 12, which illustrate the greater volatility of LNS mine output growth in comparison to mines owned by the central and local state. The figures also illustrate the greater time sensitivity of LNS mine production rates. These local non-state mines were able to stop and start production in a much more timely fashion according to economic growth and resulting electric power surplus and deficit. In contrast, during China's major economic growth period between 1992 and 1998, growth rates of state-owned mines at the central and local level significantly lag economic growth. More importantly, LNS mine output growth rates are higher than their state-owned counterparts during periods of higher economic growth, and equal to or lower than state-owned mines during periods of lower economic growth.

By December 1981 the State Council supported productive local mines, approving four forms of financial incentives, including subsidies of local mines running deficits, increasing the retention of depreciation funds, increasing investment for capital construction and technical transformation, and reduction of or exemption from industrial and commercial taxes.<sup>126</sup> In April 1983 the State Council approved the "Report on Eight Measures for Accelerating the Development of Small-scale Coal Mines", which included the pooling of funds from the "masses" (non-state sources) and operating firms themselves, pricing on the basis of quality for within-plan coal, and pricing based on negotiation for above-plan coal.<sup>127</sup>

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<sup>125</sup> Philip Andrews-Speed 2004, p.142.

<sup>126</sup> Elspeth Thomson, *The Chinese Coal Industry: An Economic History* (Routledge, 2003), p.117.

<sup>127</sup> *Ibid.*, p.118.

Responding to the high economic growth and power deficits of 1982-85, LNS mine output grew at rates that were at times multiples of the state-owned mines, and well higher than GDP growth rates. The disparity in productivity between Local State (LS) mines and LNS mines became apparent in coal policy promulgated in the middle of the 1982-88 economic boom, during which average annual growth equalled 11.5 percent. Mine opening and expansion costs between different categories of ownership were significant. CS mines in Shanxi cost RMB108 per ton to open during this period, in comparison to RMB40 for LS mines and RMB16 for LNS mines. Moreover, operation costs were often 50 to 80 percent lower for LNS mines.<sup>128</sup>

As the electric power deficit seemed to be ending by 1985, in March 1986 the Ministry of Coal Industry (MCI) announced measures to begin reducing the rapid growth of LNS mine output, stating that: i) mines producing without a plan or are exceeding plan goals “would not be supplied raw materials, loaned funds, or assigned marketing and transport targets”; and ii) “on the basis of criterion included in provincial regulations pertaining to resource use and safety management, production at privately run mines would be curtailed”.<sup>129</sup> LNS mine output growth had averaged 22.5 percent during 1982-85. By 1987 almost 75 percent of CS mines and over 50 percent of LS mines were operating in deficit. Subsequently, during the economic slowdown of the late 1980s and the power surplus of 1988-1991, the growth of LNS mine output dropped precipitously to rates equal to or lower than the central state mines. LNS mine output growth returned and again well outpaced CS and LS mines during the economic boom and power deficits of 1992-95, averaging 13.8 percent in comparison to a meagre 0.1 percent for CS mines

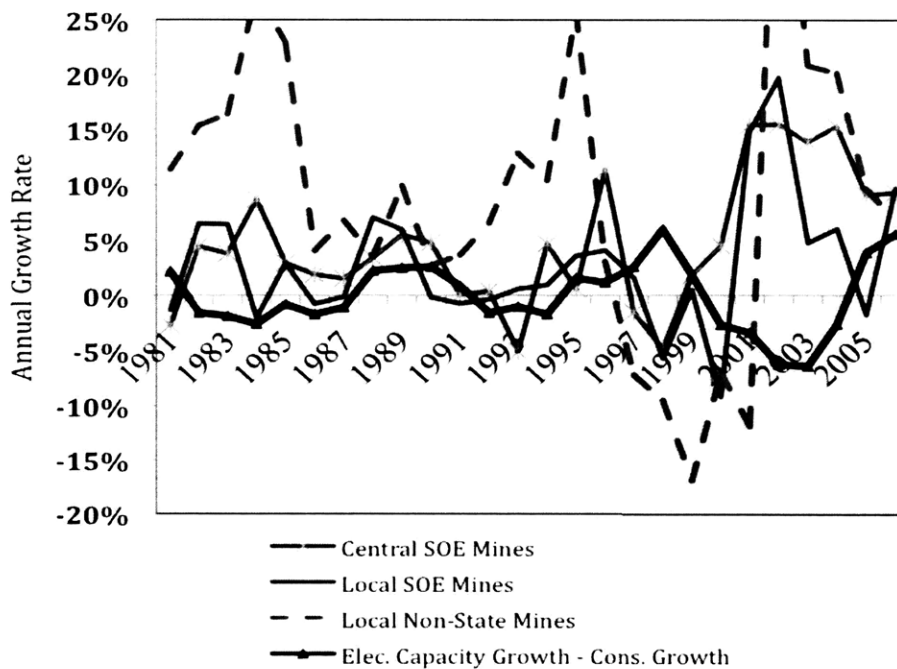
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<sup>128</sup> Ibid., p.117.

<sup>129</sup> Philip Andrews-Speed 2004, p.142.

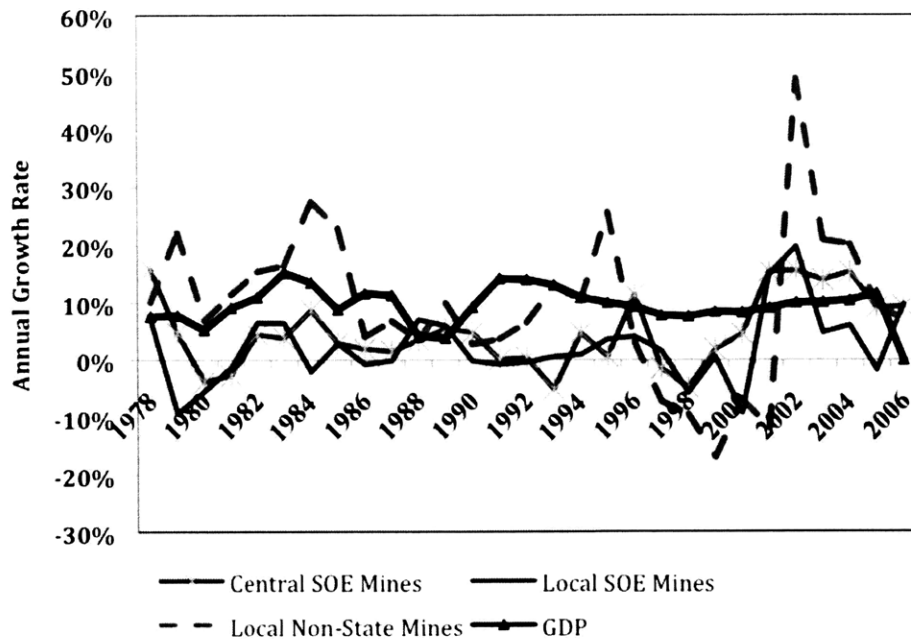
and 1.2 percent for LS mines. By the end of 1997 power surplus returned and peaked in 1998, and the combination of a slowing economy and central government rhetoric regarding the enforcement of regulation closing down LNS mines led to significant declines in LNS mine output growth.<sup>130</sup> Major power deficits then returned with the economic growth beginning in 2001 and LNS mine output exceeded state-owned counterparts once again, only to fall once power capacity began to outpace consumption. The overall pattern is clear: during high economic growth LNS mine growth rates far exceed CS and LS mine growth rates; during moderate economic growth, LNS mine growth rates fall dramatically (often below CS and LS mine rates).

**Figure 11. Electric Power Balance and Mine Growth by Ownership**



<sup>130</sup> While the growth rate did decline, the severity of the drop in LNS mine output growth rates during the period 1998-2002 is considered by most to be suspect due to significant underreporting. Figure 6 data between 1998 and 2002 accounts for aspects of this distortion by including estimates of unreported coal production. See Kevin Tu, "Statistical Distortion and Value Chain of the Chinese Coal Industry", presentation to PESD, Stanford University, February 11, 2009.

**Figure 12. GDP Growth and Mine Growth by Ownership**



Source for Figures 11 and 12: LBNL, China Energy Databook, 2008.

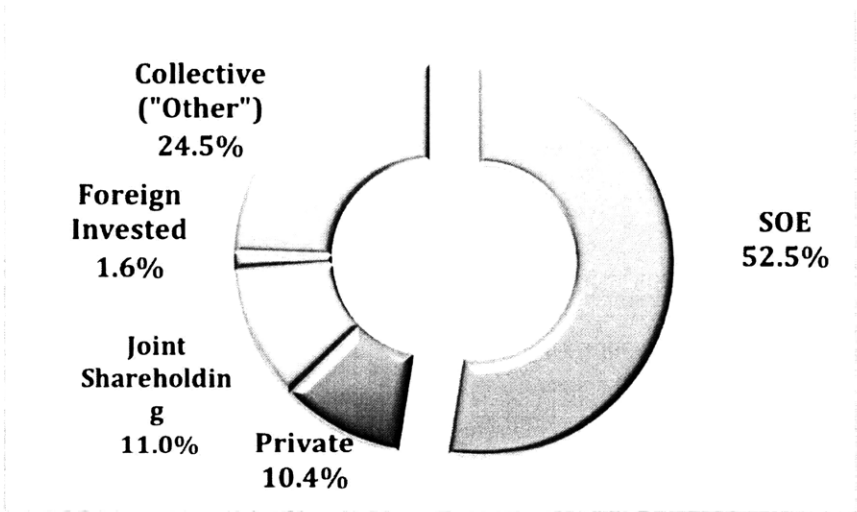
As a result of such growth patterns, the overall share of output contributed by LNS mines increased from 14.1 percent in 1978 to 38.3 percent in 2006. By 2006 more than half (52.0 percent) of China’s coal was produced by firms owned by actors outside of the central government. As Elspeth Thomson has documented:

“By the late 1970s the government had recognized that the fastest output growth was being achieved by the LNS mines and that their continued existence was vital to the economy. It therefore adopted a policy of spending the limited capital resources available on a few key large mines and infrastructure projects too large and capital-intensive for the peasants to undertake. Operators of local mines were encouraged to open mines using whatever resources they could find.”<sup>131</sup>

<sup>131</sup> Elspeth also points out the additional attractions of local mines: “Besides mitigating the shortage problem, relieving the critical lack of railway capacity on the north-south lines, and costing half as much to build and operate, LNS mines also contribute to other Chinese government objectives. They become operational much sooner, add to the wealth of peasants, help reduce rural unemployment, stem rural-urban migration, stimulate the development of rural industry and help halt the ecological damage resulting from the scavenging for firewood.” Elspeth Thomson, “Reforming China’s coal industry,” *China Quarterly* (1996): 729.

Even during the most recent period of high economic growth since 2002, during which CS mines did begin to increase output rapidly, LNS mine output growth rates again exceeded that of both central and local state-owned mines. Financial data for LS and LNS coal firms highlight both their economic importance and their ownership diversity. Recent sales income figures, which distinguish between private, joint shareholding, collective and foreign invested firms, reveal the range of non-state actors that is obscured by aggregate national statistics. As seen in Figure 13, 48.5 percent of total sales income for the coal industry in 2005 was earned by firms without controlling stakes owned by the central or local government.

**Figure 13. Breakdown of Total Sales Income by Firm Type, 2005**



Source: China Economic Reporting and Monitoring Center (ed.) *Zhongguo chanye ditu nengyuan 2004-5*, (Beijing: Shehui kexue wenxian chubanshe, 2006), p.203.

Much of this decentralization of ownership and investment resulted from the gradual liberalization of coal pricing that began formally in 1984, as a result of economic growth doubling from 5.1 percent in 1981 to 10.9 percent in 1983. Coal prices were therefore partially liberalized in 1984, immediately preceding the 1986 regulation allowing sub-

central government actors and firms to invest in electric power generation, discussed at length below.<sup>132</sup> In particular, prices were reformed to account for coal quality differences in the early 1980s and in 1984 a dual track system of prices was introduced, as it had been earlier in agriculture, to create incentives for increased production.<sup>133</sup> Each production unit produced a fixed quota amount of coal at a state-set price to be distributed by state channels to demand industries such as metallurgy, steel, and chemical production.<sup>134</sup> Above-quota coal could either be sold back to the state at 50 percent higher prices (and eventually 70 percent higher prices) or on the emerging free (largely illegal “black”) market.<sup>135</sup> Coal exchanges, that were established in five cities in 1992 to reduce the extortion occurring through middlemen, had little effect and the black market continued. By June 1993 the central government allowed central state-owned mines (SCMs) to sell 80 percent of their coal production at market prices, and by 1994 decreed all coal freed from quota prices.<sup>136</sup> There was considerable backsliding, as many government officials had profited from arbitrage between market and state prices for coal. Also, thermal coal prices for power plants continued to be subsidized, yet by June of 2004 Guizhou was technically the last province to abolish state subsidized thermal coal pricing for power plants on July 1, 2006.<sup>137</sup>

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<sup>132</sup> See State Council Notice document no. 86, April 17, 1986: ‘Provisional Regulation on the Encouragement of Fundraising for Power Construction Investment and Implementation of the Multi-Rate Power Tariff’.

<sup>133</sup> Barry Naughton 1995.

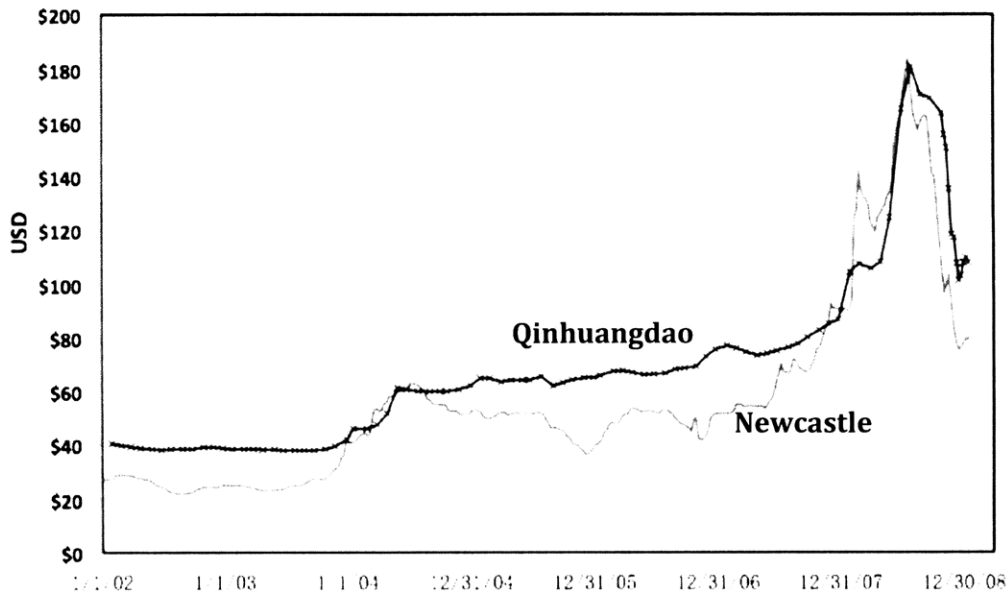
<sup>134</sup> Bin Wang, “An imbalanced development of coal and electricity industries in China,” *Energy Policy* 35, no. 10 (2007): 4959-4968.

<sup>135</sup> Elspeth Thomson 1996, p.745.

<sup>136</sup> Ibid.

<sup>137</sup> For detailed analysis of this process, please see Elspeth Thomson 2003.

**Figure 14. China's Thermal Coal Spot Prices Converge with Regional Benchmark**



*Source:* Newcastle data from Reuters. Qinhuangdao data from China Coal Transport and Distribution Association (CCTD), converted with daily exchange rate data from NY Fed and calorific value (QHD: 5800 kcal/kg, NWC: 6700 kcal/kg). This graph profited greatly from discussions with He Gang and others at PESD, Stanford University.

In addition to price liberalization, reforms in the 1990s allowed progressive marketization through the organization of annual bargaining conferences (termed “*dinghuohui*”) between the major mines, power plants and Ministry of Railways (MOR). The role of the NDRC as an active player in these sessions has gradually declined, transforming instead to a mediator role. The state-led conference was formally abolished in 2004 but the negotiation meeting continues in an evolved form named the Coal Production, Transportation and Demand Linking Session (“*meitan chanyunxu xianjiehui*”), as all coal contracts still must be accompanied by signed documentation from the MOR indicating that sufficient rail capacity has been reserved to transport the

coal under contract.<sup>138</sup> Thermal coal prices on the spot market rose 25–30 percent year-on-year by mid-2004, while contract prices in China had increased by less than 10 percent. Due to this disparity, power plant managers interviewed all observed that since 2003 mines have continually renegotiated their prices and failed to deliver coal to the plant at the contract price. The domestic media has also reported openly about the extent of the problem.<sup>139</sup> These liberalization policies eroded coal subsidies considerably and by 2002 the spot price of Qinhuangdao coal (QHD), China’s widely referenced thermal coal benchmark, had aligned closely with rising international prices. As Figure 14 illustrates, prices of Qinhuangdao coal in China and Newcastle coal in Australia tracked well through the most recent volatility caused by rapid demand shocks in the region.

### *Electric Power Industry*

Processes of ownership and investment diversification have also penetrated upstream in the electricity generation industry, the result of far-ranging reforms in electric power generation.<sup>140</sup> As occurred in the coal industry, the financial and administrative resources of the central government proved inadequate to meet power generation demand; a shortage that by the boom years of the early 1980s became acute. Resulting reforms pursued by the central government sought to: i) diversify sources of finance and augment state-directed capital by allowing, for the first time, non-central government entities to invest in and build power plants; ii) raise electricity tariffs by abolishing command era pricing that only covered operating, transmission and

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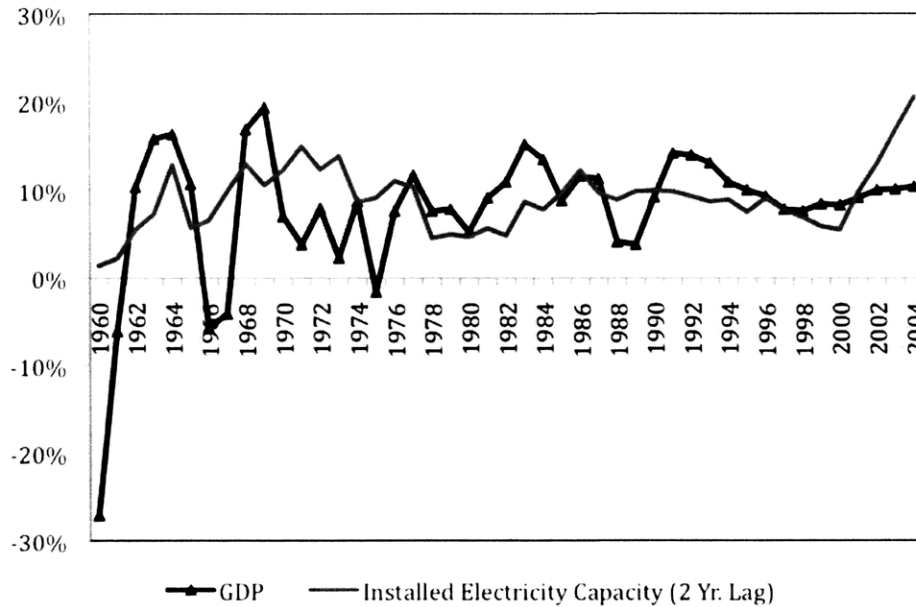
<sup>138</sup> In late 2005 the NDRC promulgated “*Guanyu zuohao 2006 nian quanguo zhongdian meitan chanyunxu xianjiehui gongzuo de tongzhi*”, which made clear that the NDRC had abolished the “temporary interference” of the central government in coal pricing for electricity generation and encouraged the signing of long-term contracts between coal and electricity firms.

<sup>139</sup> “Favorable coal prices to be abolished” *China Daily*, 23 July 2004.

<sup>140</sup> For an excellent review of reforms in China’s electricity sector see Chi Zhang and Thomas Heller 2007.

distribution costs and introducing “cost-plus” or “rate of return regulation” that accelerated capital repayment and guaranteed 12-15 percent returns; and iii) levy a series of national fees to create specialized funds for capital investment.

**Figure 15. GDP vs. Installed Electric Power Capacity Growth Rates**

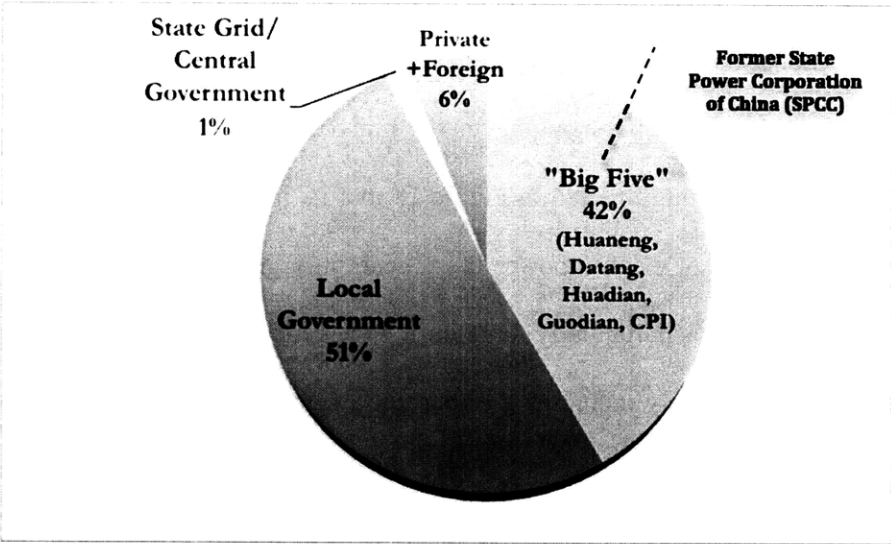


*Source:* LBNL, China Energy Databook, 2008. (To compensate conservatively for the average two years needed for a plant to come online in China, data corresponding to electric power growth rates has been moved back two years to allow appropriate comparison.)

A constellation of local and regional government actors that resulted from such reforms now extends deep into the power generation sector, including provincial government investment funds, local government SOEs, grid and grid-subsubsidiary groups, and nuclear power firms. This complexity has only recently been noted by a few studies. Chi Zhang and Thomas Heller observe that: “During long periods of shortage, Chinese reforms focus on getting new power on line as quickly as possible, and delegate much of

the task of adding capacity to provincial and local authorities.”<sup>141</sup> In the six years since the dissolution of the State Power Corporation of China (SPCC), which once vertically integrated regional electric grids and electric power generation and the assets of which were transferred to the “Big Five” listed generating companies, it is notable that these five firms command less than half of China’s electricity generation market.

**Figure 16. Ownership of Power Generation Capacity, 2007**



*Source:* Figures are compiled according to “controllable capacity” by each firm. China Electricity Council, 2008; Arthur Kroeber, “Enigma Variations: Unwrapping the Riddle of China’s Electricity Industry”, *GaveKal Dragonomics China Insight*, August 26, 2008; Author’s estimates.

The energy corporation initially served as a vehicle to resolve increasingly blurred rights and claims between central and local control over energy assets produced by such a constellation of ownership cross-shareholding between multiple levels of government. Corporatization also served to attract foreign technology and financing to develop domestic resources under tight credit market conditions and poor fiscal capacity. Initial

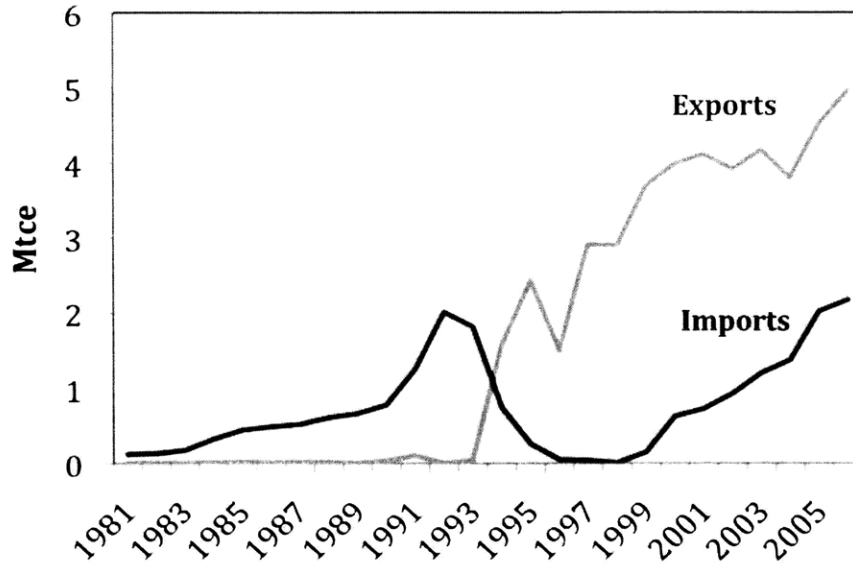
<sup>141</sup> Chi Zhang and Thomas Heller 2007 p. 77.

reforms were rather successful. For example, in 1975 China suffered from a shortage of approximately 5 GW, or 12 percent of national generating capacity; this grew to 15 GW, or 16 percent, by 1986.<sup>142</sup> The early 1980s witnessed the importation of electric power and the rise of power plant utilization rates (annual hours operated) as capacity continued to be squeezed. As Figures 17 and 18 illustrate below, rapid increases in electricity capacity began in the late 1980s to respond both to these historical shortages as well as the fast-growing demand resulting from the expansionary economic reforms of the early 1980s. The impact of the initial entrance of investment from local government, private and limited foreign sources beginning in the mid-1980s is evident in the lowering of utilization rates beginning in 1986 in Figure 18, but its limitations are also suggested by the continued import of electric power those years in Figure 17. The entrance of these non-central players was particularly rapid during the economic boom of the early to mid-1990s, resulting in supply increases that became evident in the ability to export power and rapidly dropping utilization rates. By the late 1980s annual capacity increases averaged a respectable 15GW, continuing through the boom of the 1990s. By 1994 power exports exceeded imports for the first time.

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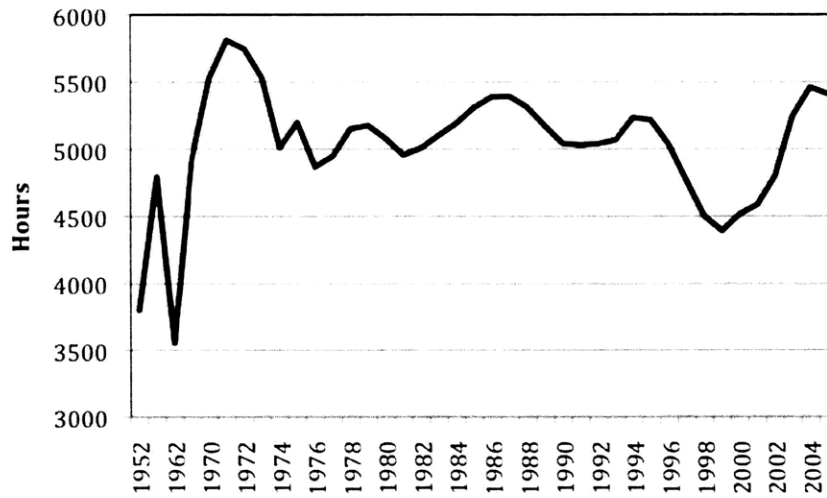
<sup>142</sup> See State Council Notice “Speeding up the development of the electricity industry”, document no. 114, July 25, 1975; Chi Zhang and Thomas Heller, 2007, p. 93.

**Figure 17. Electricity Imports and Exports**



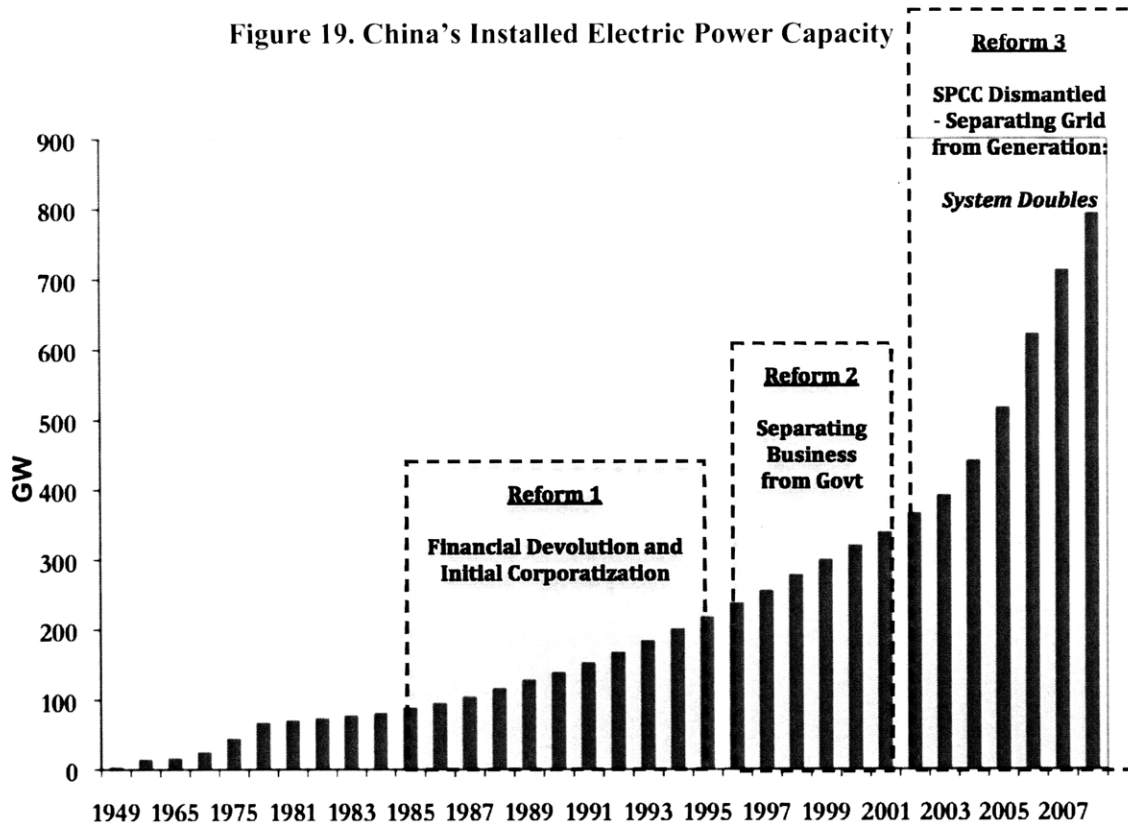
Source: LBNL, China Energy Databook, 2008.

**Figure 18. Annual Thermal Utilization Hours**



Source: Huaneng Group, Internal Presentation

Figure 19. China's Installed Electric Power Capacity



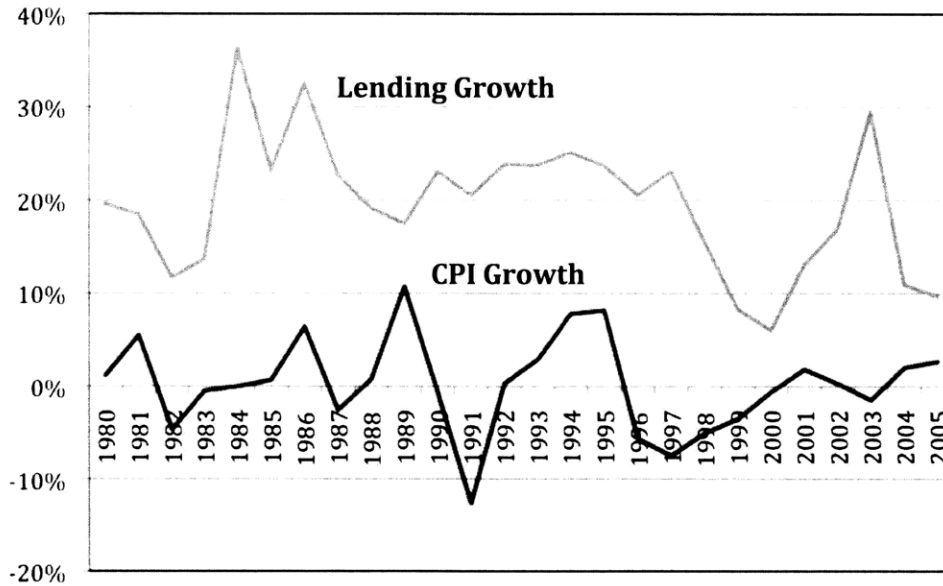
Source: LBNL, China Energy Databook, 2008; China Electricity Council, 2009.

Renewed high rates of economic growth, averaging 11.7 percent between 1982-84, spurred financial reform of the electric power industry with the passing of legislation that transformed direct state funding of power plant construction into loans from state banks.<sup>143</sup> The deflation of prices in 1982 strengthened support for such loans and the period 1984 to 1988 produced among the highest loan growth rates of the reform period. Price reform deepened in 1986, and was highlighted by the promulgation of the

<sup>143</sup> See Ministry of Electric Power Notice "Provisional measure transforming all budgetary infrastructure fund allocations into loans", document no. 84, December 27, 1984. This was followed months later by the MOEP Notice "Central government and State Council leaders' memo on questions relating to the utilization of foreign financing to speed the building of electric power", document no. 54, February 26, 1985.

‘Provisional Regulations on Encouraging Fund Raising for Power Construction and Introducing Multi-Rate Power Tariff’.<sup>144</sup>

**Figure 20. Bank Lending and CPI Growth**



*Source:* NBS, China Economic Yearbook, multiple years

This battery of reforms increased wholesale prices and diversified sources of finance by permitting sub-national government, private, and eventually foreign-invested entities to invest, in an effort to encourage investment through three main mechanisms. To attract new investors, the reforms raised the wholesale tariffs paid to the power producers and introduced a pool purchase price (PPP) to a ‘cost plus’ formula that guaranteed a 12–15 percent rate of return for newly invested plants. In addition, an RMB0.02 fee was added to the end-user retail prices nationwide to raise capital for the newly established electricity construction fund. Lastly, a wide range of special fees and charges, such as the ‘fuel and transportation surcharge’, were also allowed by 1986. These fees were

<sup>144</sup> See State Council Notice document no. 86, April 17, 1986.

collected by the central and local governments to finance various projects such as the Three Gorges dam project and the “coal for oil substitution” project and a portion was also disbursed to local projects.<sup>145</sup> Such reforms diversified ownership, diluting the central government’s share of generation assets, and also introduced sufficient sub-national funding to increase generation capacity and largely solve the major power shortages of the 1980s and early 1990s.<sup>146</sup>

Firms such as the Huaneng Group proved effective at building partnerships with foreign financial institutions and creating the foundation for rapid expansion. The prominence of electricity firms in this crucial stage of policy and economic reform is reflected in the fact that six of the original 22 SOEs approved by the State Council to issue shares in overseas stock markets hailed from the electric power industry.<sup>147</sup> Huaneng Power International, Incorporated (HPI) was established in June 1994 and in October of the same year listed on the New York Stock Exchange, issuing \$1.25 billion in American Depositary Receipts.<sup>148</sup> By 1995 over 40 power investment companies had begun operation, forming what has been characterized by some scholars as ‘a group of independent power producers (IPPs)’.<sup>149</sup> In late 1995 the China Power Investment Corporation had been established to support and channel foreign capital investment into the industry. By January 1998, HPI was listed on the Hong Kong Stock Exchange and in

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<sup>145</sup> Zhang Chi, “Reform of Chinese electric power market: economics and institutions”, PESD draft paper, Stanford University, 31 January, 2003. p.9.

<sup>146</sup> Intermittent short-term shortages always existed, as is the case in most developing (and, occasionally developed) nations.

<sup>147</sup> The six firms are Huaneng International Joint Stock Company, Shandong Huaneng Electricity Joint Stock Company, Shandong International Power Development Company, China Harbin Power Plant Equipment Group, Northeast Electric Transmission and Transformation Equipment Corp, Datang Power Company. The listings occurred in 1994.

<sup>148</sup> Investor Communication company document, ‘In pursuit of world class corporate governance and IR’; see < [www.fa100index.com/images/PDF/huanengpower.pdf](http://www.fa100index.com/images/PDF/huanengpower.pdf)>.

<sup>149</sup> Xu 2002, p,127.

November 2001 the firm successfully issued A-shares in the domestic market. By March 1997, another power firm – Beijing Datang Power Generation Corporation – became the first Chinese firm to list on the London Stock Exchange. In December 1996 the State Power Corporation of China (SPCC) had been established and within a few months the MOEP had been transformed into the Department of Electric Power within the SETC, with a staff reduced to fewer than 20 people. This reorganization served to separate production, including both generation and distribution, from regulatory functions.

The great expansion of power that began in the mid-1980s through the reforms discussed above also heralded the relative decline of central funding for such expansion. For example, between 1980 and 1994, “the annual growth rates of both power generation and installed capacity averaged more than 8 percent, while between 1980 and 1992, the share of central government investment in total power sector investment decreased from 91 percent to 30 percent”.<sup>150</sup> In cumulative terms, the central government provided nearly half of power industry investment during 1985–90. In the following five years, however, between 1991 and 1995, only one-third of investment funds flowed from the central government. Financial levers of influence have clearly narrowed. In the same period, local sources accounted for 42.9 percent of the total. The third largest category of investment was foreign, equalling 9.9 percent. Moreover, the variation across regions was considerable, from provinces such as Tibet that were dominated by central state funds, at 98.7 percent, to powerhouse Guangdong market, in which only 3.5 percent of funding was from the central state.<sup>151</sup> Statistics for the Southern Grid reveal both the progressive efforts of local government to meet rising power demands and the necessary freedom

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<sup>150</sup> Binsheng Li and James Dorian (1995) ‘Change in China’s Power Sector’, *Energy Policy*, 23 (7): 619–626. p.625.

<sup>151</sup> Xu 2002, p.172.

from central guidance that the region enjoyed in order to succeed. Foreign investment shares were highest in Guangdong and Hainan (23.2 percent and 21.7 percent respectively), as were local government investments (54.1 percent and 41.7 percent).<sup>152</sup>

*Rise of Foreign Investment – An early “Shock Absorber” in Electric Power*

While local government and domestic private investment played a major role in resolving shortages in electric power supply, foreign investment also provided critical capital and higher efficiency equipment when high levels of economic growth were sustained beginning in 1992. The role of foreign investment was not only important for energy growth, but the evolution of foreign involvement provides a clear example of how non-central firms were encouraged by the central government in times of shortage then constrained once energy supply was increased. This approach was evident in the coal industry as well, whereby policies were pursued to discourage Local Non-State mines through institutional means.

Foreign firms were courted by the central government to contribute to the growth in electric power generation through investment and the import of high efficiency equipment. By 1995, MOEP estimates calculated that a total of 18 GW of capacity would require foreign funding in the period 1996-2000, at a cost of \$11-14 billion. An influential 1994 report addressing energy efficiency targets prepared by the MOEP called for average thermal efficiency of power generation to rise from under 28 percent in 1993 to 33 percent by 2000 and eventually to 35 percent by 2010 through the restriction of small plant construction and the use of advanced combustion technology.<sup>153</sup>

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<sup>152</sup> Ibid., p.173.

<sup>153</sup> Woo, p.14.

As Blackman and Wu have detailed, between 1978 and 1993 overseas sources invested \$14.3 billion in the electric power sector, or 10 percent of total investment.<sup>154</sup> Nearly 85 percent of such funds were sourced from governments or multilateral lending institutions such as the World Bank, which entailed protracted planning and approval processes. As the foreign capital required in the five-year period between 1996 and 2000 was at least as great as the total amount of capital received from public sector sources from 1978 to 1993: “the short time horizon envisioned by Chinese planners was not compatible... thus, foreign direct investment was seen to be needed to cover expected financing shortfalls.”<sup>155</sup>

The year 1996 resulted in a raft of new laws that brought legal, if not regulatory, clarity to the power industry. The Electricity Law was passed and allowed non-state entities to participate in the generating sector, while also furthering the separation of regulatory and ownership functions of power producers. Between 1998 and 2002 subsequent legislation revised and clarified regulatory changes designed to separate generation and transmission assets formally, split generation and transmission pricing, launch small-scale market power pooling trials and elaborate future reform objectives.<sup>156</sup> These objectives included (a) the formal separation of generation from transmission in terms of ownership and regulation; (b) the establishment of new pricing mechanisms to internalize environmental costs more effectively; (c) the creation of competitive regional markets for the dispatching of generators; and (d) the development of market-oriented pricing mechanisms throughout the power value chain, from generation to transmission,

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<sup>154</sup> Li and Dorian, p.623.

<sup>155</sup> Blackman and Wu, p.700.

<sup>156</sup> Prominent examples of such legislation were State Council Documents 146, 5 and 2704 of 2002; and later 2 of 2003 and 432 of 2005.

distribution, and retail pricing.<sup>157</sup> Cross-subsidization through price discrimination still plagued the sector however. For example, in 2002 the average rural price for electricity was RMB0.66/kWh, compared to an urban average of RMB0.44/kWh. The largest differential between regions reached RMB0.264/kWh.<sup>158</sup>

The combination of policies designed to attract foreign investment was largely successful (see Figures 21 and 22). Between 1996 and 2000, \$13.26 billion of greenfield investment was sourced from foreign sources – a number at the high end of the \$11-14 billion range of investment need estimated in 1995. Of the 18 GW target, an estimated 13.9 GW were built through FDI invested plants.<sup>159</sup> By 2002, 13 percent of total investment in the Chinese power industry was foreign – double the percentage of foreign investment in capital construction in all sectors that year.<sup>160</sup> As Figure 21 illustrates, it is noteworthy that at the height of foreign investment in this sector, the central government moved to establish in its portfolio of firms a major state-owned alternative vehicle for managing electric power assets: the State Power Corporation of China (SPCC).

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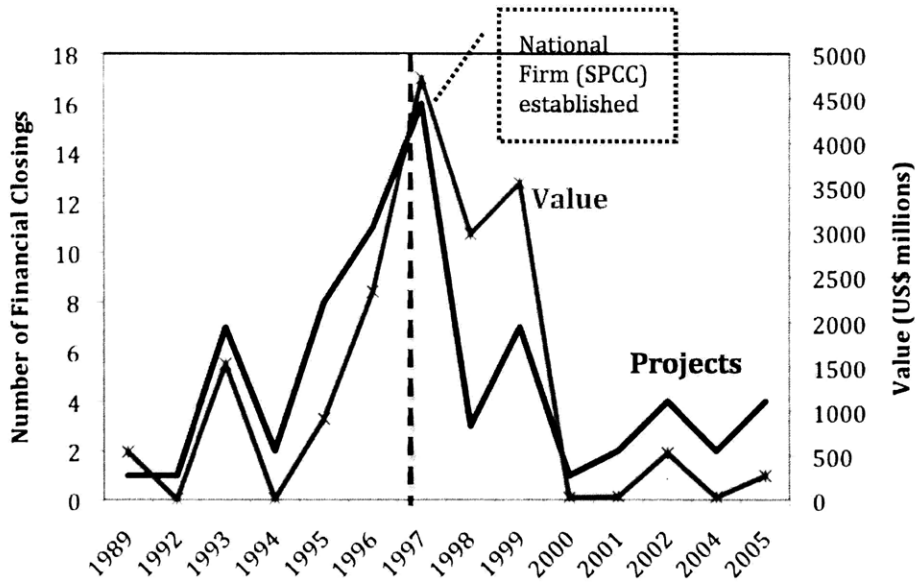
<sup>157</sup> Edward Steinfeld, “Energy Policy: Charting a Path for China’s Future”, World Bank China Note, June 2004.

<sup>158</sup> State Council Office of Economic Restructuring, ‘Zhongguo dianli jianguan jigou jianshe yanjiu baogao’, November 2004, p. 150.

<sup>159</sup> Blackman and Wu, p. 710.

<sup>160</sup> Woo, p.11.

**Figure 21. Private (Foreign) Investment in Electricity Generation**



Source: World Bank, Private Participation in Infrastructure Database.

**Figure 22. Capital Construction in Electric Power (1995-2000)**

<u>Source</u>	<u>Amount (RMB billion)</u>	<u>Share</u>
Central Government (Bank Loans, Transfers, Funds)	256.47	44.4%
Local Government	103.82	17.0%
Enterprise Internal Funds	76.46	13.2%
Foreign Investment	101.54	17.5%
Bonds (Central and Local)	6.27	1.1%
Other	32.8	5.7%
<b>(Total Non-Central Sources)</b>	<b>(320.89)</b>	<b>(55.2%)</b>

Source: SPCC, *Dianli gongye jiuwu zongji* (Beijing: Zhongguo dianli chubanshe, 2001), p.271.

### *Fall of Foreign Investment*

Figure 21 illustrates both how foreign investment rapidly entered China's electric generation industry during the economic boom of the 1990s, and also how precipitously both the number of projects and value of such projects dropped between 1998 and 1999 and remained low despite subsequent high economic growth beginning in 2002. Foreign investment, having been attracted in times of energy shortage, was systematically discouraged by the State Planning Commission (SPC) of the central government through several institutional means once power shortage had been resolved. This discouragement primarily took the form of renegotiated tariffs, renegotiated post-tax rates of return on equity, delayed approval of projects, and redefined regulations regarding "priority" projects.

As economic growth rates dropped from above 14 and 13 percent in 1993 and 1994, to under eight percent in 1998, electric power capacity rates recovered.<sup>161</sup> As seen in Figure 17, by 1996-1997 electric power imports had dropped to zero and power exports had begun to grow. In the context of slowing growth the SPC began to alter the institutional rules governing investment in the industry. First, priority was given to FDI projects that: (i) employed domestic equipment; (ii) employed domestic contractors and managers; (iii) were located in less-developed Central and Western regions; (iv) were low-cost; and (v) were environmentally friendly and involved advanced technology. Second, exemptions from import tariffs and duties for foreign firms were eliminated. In

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<sup>161</sup> Many Chinese economists consider the 1998 GDP growth rate of 7.8 percent to be an overestimate by several percentage points – see Lowell Dittmer and Yu-Shan Wu, "Leadership Coalitions and Economic Transformation in Reform China: Revisiting the Political Business Cycle", in Lowell Dittmer and Guoli Liu (eds.), *Domestic Politics in Transition: China's Deep Reform* (Maryland: Rowman and Littlefield, 2006), pp.61.

April 1996, foreign investor's exemptions from tariffs and duties on imported generating equipment smaller than 350 MW were canceled. These import tariffs were substantial, equaling 38% on generating equipment smaller than 350 MW (in comparison to 6% for larger units).<sup>162</sup> Third, the post-tax internal rate of return on equity that had ranged from 15 to 17 percent in the early to mid-1990s was reduced to 10 percent by the late 1990s and eventually downgraded to an unspecified status in power purchasing agreements.<sup>163</sup> By 2003 a report in the *International Finance News* stated: "Those foreign direct investors which have built plants before 1994 and signed power purchasing agreements, as well as investments with guaranteed power price or investment return approved by the State Council after 1994 . . . will have to renegotiate the contracts and should participate in power pooling and bidding."<sup>164</sup>

The removal of these guarantees greatly reduced the expected returns that foreign firms required to accept the high risk of participating in China's infrastructure build-out. Such risk increased when the economic slowdown beginning in 1997 revealed how past reforms to attract investment had created differentials in power tariff (price) paid to new and to old power generating units. The dual track pricing introduced in the 1980s to spur investment determined tariff rates according to the date a generating unit came online. Units that were built before 1985 – and therefore before the major 1986 reform that pluralized investment<sup>165</sup>, discussed above – had been allocated capital through the central government and therefore were paid a low tariff from the grid that covered operating

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<sup>162</sup> A. Gruettner, "Regulations Irk Suppliers," *China Business Review* 30 (1997).

<sup>163</sup> Li and Dorian, p. 621. Woo, p.25.

<sup>164</sup> Eric Ng, "China Power Reform to Hit Foreign Firms", *South China Morning Post*, Jan. 18, 2003.

<sup>165</sup> See State Council Notice document no. 86, April 17, 1986: 'Provisional Regulation on the Encouragement of Fundraising for Power Construction Investment and Implementation of the Multi-Rate Power Tariff'.

costs. In contrast, units built after the reform were financed from multiple sources. Tariffs for these units were calculated according to a cost-plus model in which capital and variable costs were repaid, as well as a certain level of return.<sup>166</sup> This rendered the investment attractive to foreign investors, who were receiving a price premium from the power grid of anywhere from 20-30 percent. A 2001 industry research report cited the tariff received for units built before 1985 to equal RMB 24/MWh while units built after 1985 received a tariff of 33/MWh. The national average tariff equaled RMB 29/MWh.<sup>167</sup> During periods of energy shortage the grid was required to purchase all generated power, rendering such differences immaterial. Once shortages subsided older plants built before 1985, with lower tariffs and assets nearly fully appreciated, became more attractive to the dispatch centers of the regional grids – many of which owned the domestic generation firms.

As Figure 21 depicts, the renegotiation of contract terms, tariffs, rate of return guarantees, and the often low capacity at which foreign invested plants were run due to dispatch manipulation, combined to wipe out foreign investment nearly as quickly as favorable policies had welcomed such investment. As seen in Figure 23, results of a March 1998 survey of international developers, consultants, lawyers, lenders and investors operating in China reinforce the importance of these risks to power projects, listing “tariff adjustment”, “dispatch constraint” and “change in law” as three of the top four “extremely critical” risks.

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<sup>166</sup> Sarah Wee and Kenneth Wee, “Foreign Projects in China’s Power Industry: Tariff Reductions and Renegotiations,” *The Electricity Journal* 16, no. 6 (2003), p.59.

<sup>167</sup> Boon-Siew Yeoh and Rajesh Rajaraman, “Electricity in China: The latest reforms,” *The Electricity Journal* 17, no. 3 (2004), p.66.

**Figure 23. Survey of Risk in Chinese BOT Power Projects**

Unique or Critical Risk	% of Respondents Who Answered						Mean Score	Ranking
	Extremely Critical	Very Critical	Critical	Fairly Critical	Not Critical	Not Applicable		
Tariff Adjustment	66%	28%	3%	0%	0%	3%	4.50	1
Chinese Reliability	52%	33%	15%	0%	0%	0%	4.36	2
Dispatch Constraint	52%	33%	15%	0%	0%	0%	4.36	2
Change in Law	52%	36%	6%	6%	0%	0%	4.33	4
Exchange Rate	45%	39%	15%	0%	0%	0%	4.30	5
Force Majeure	34%	34%	22%	9%	0%	0%	3.94	6
Financial Closing	26%	35%	32%	3%	0%	3%	3.74	7
Delay in Approval	24%	30%	36%	9%	0%	0%	3.70	8
Expropriation	44%	13%	19%	13%	13%	0%	3.62	9
Corruption	9%	18%	38%	18%	9%	9%	2.74	10

*Source:* Shouqing Wang, Robert Tiong, SK Ting, D. Ashley, "Risk management framework for BOT power projects in China," *Journal of Project Finance* 4, no. 4 (1999), p.60.

*Rise and Fall of State Power Corporation of China*

The experience of foreign investors is important for two primary reasons. First, this evolution of investment serves as an important precedent of the ways in which necessary investment outside the central government's coffers was successfully utilized to supplement the rapid building of an energy system and then effectively constrained. This pattern is evident in the ownership data of coal over time, as discussed above, and is also evident in the treatment of private and semi-private Chinese investment in the electric power industry more recently. Many of these investors sought to profit from the major energy reforms in China, believing that while foreign investment could be easily manipulated by central and local government, similar measures of central authority would be adequately countered by local protectionism. As the two case studies detail in the chapters that follow, results did vary.

Second, foreign investment was constrained through a combination of specific policy changes and an underlying systematic local protectionism exposed by slowing

economic growth. The degree of local protectionism proved to be so great that it motivated in large measure the centralization of power generation and distribution in the hands of one actor – a national firm named the State Power Corporation of China (SPCC). The firm, founded in 1997 and dismantled in 2002, sought to wrest ownership of generating assets from regional local grids in an attempt to resolve preferential dispatching problems and integrate the grid's management nationally. The firm was founded as an attempt at corporate centralization following the great surge in electric power supply of the early to mid-1990s and the resulting bottoming of utilization rates (see Figure 18). The timing of its creation is revealing, illustrating again the importance of national energy balance in the launch of centralization efforts, and also the costs of devolution in the eyes of central government policymakers.

However, the troubles experienced by the SPCC itself soon provided evidence that ownership of generation and grid assets under one roof invited further manipulation of dispatch and that complete separation between these assets was necessary. In some provinces, regional subsidiaries of the SPCC were dispatching plants owned by the firm and not plants owned by the provincial and local government or foreign investors. In other provinces, provincial and local governments manipulated local dispatch centers to dispatch locally owned plants. Many employees in these dispatch centers, originally employees of the provincial power bureau and only recently (and technically) employees of the SPCC, had invested their personal funds into vast swathes of the provincial or local government owned electric generation capacity, thus dispatching to local firms for their own financial gain. While diversification of ownership and investment had spurred rapid supply growth, it also generated significant complexity in the industry's governance.

In 1998, despite controlling over 49 percent of national electric power generating capacity, the SPCC had earned a mere RMB7.01 billion in profits, based on sales revenue of RMB260.64 billion.<sup>168</sup> Economic growth rates had dropped from over nine percent in 1997 to seven percent in 1998. Slowing growth, the poor financial performance of the SPCC, and the “Ertan Incident” (described below) led to the December 2002 breakup of the national firm into two grid companies, five generation companies (termed the “Big Five”), and several service and ancillary companies. Additionally, 6.47GW of installed capacity was allowed to remain under the authority of the State Power Grid Company for eventual sale in an effort to finance power grid development, and 9.2GW was assigned to a separate firm to cover non-core business expenses.<sup>169</sup> The evolution of the SPCC is illustrated below in Figure 24.

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<sup>168</sup> Matthew Miller (2000) ‘Beijing’s power sector feels wind of change’, *South China Morning Post*, 13 January. p.10.

<sup>169</sup> Woo, p.9.

**Figure 24 (a,b,c). Recent Evolution of Electric Power Sector Assets**

**(Operational Control)**

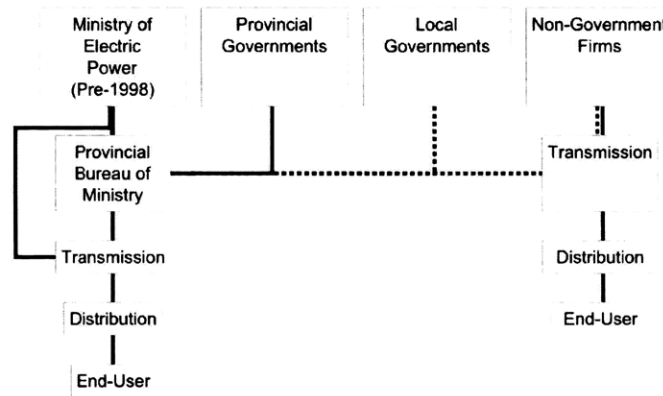
**A. Mid- to Late-1990s\***

**Central Government**

- Generation: 46%
- Trans. + Distr: 87%

**Sub-Central Actors**

- Generation: 54%
- Trans. + Distr: 13%



\* Adapted from Zhang and Heller, p. 94. Solid lines note generating capacity trusted to the provincial bureau of the Ministry for operation (then placed under SPCC subsidiaries after 1997), while dashed lines note generating capacity that sells into the grid by other entities. The terms “Generating Capacity” and “Trans. + Distr.” under the charts represent shares of generating capacity and electricity distributed, respectively. Figures are estimates for 1997, 2002, and 2007. See also <http://www.buyusa.gov/china/en/power.html>.

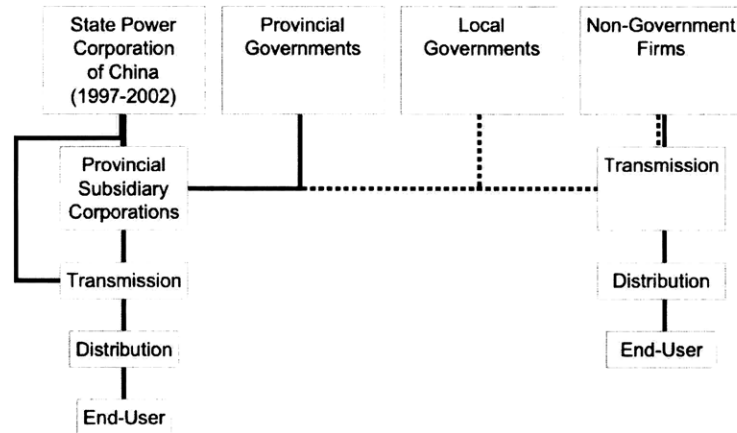
## B. 1997-2002

### Central Government

- Generation: 46%
- Trans. + Distr.: 87%

### Sub-Central Actors

- Generation: 54%
- Trans. + Distr.: 13%



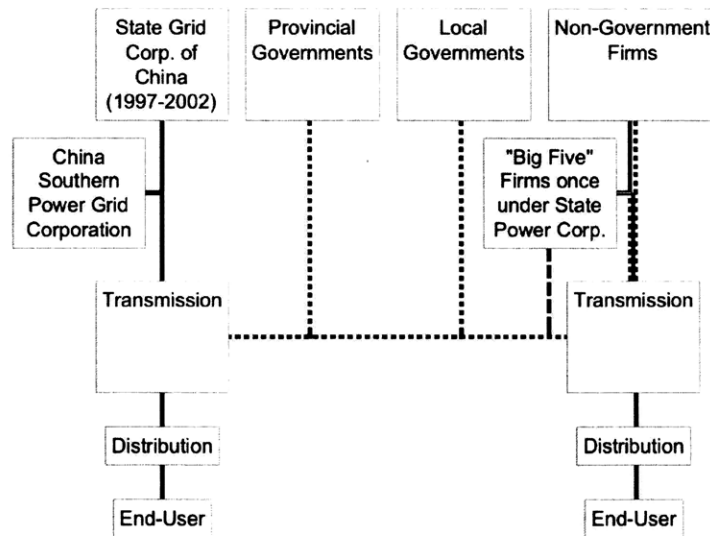
## C. Post-2002

### Central Government

- Generation:  
1% (Direct Operations)  
42% (Ownership through "Big Five")
- Trans. + Distr.: 89%

### Sub-Central Actors

- Generation: 57%
- Trans. + Distr.: 11%



### *Ertan Incident – The Costs of Devolution*

The dissolution of the SPCC was motivated in large part by the recognition that simply stripping grid and power generation assets from local governments and centralizing such assets in the form of a national firm did not resolve the political manipulation of the energy market. Regional grids, although the majority were owned by the SPCC beginning in 1998, were granting privileged dispatch to the generation plants they owned. In periods of energy shortage, this proved to be a minor problem, as all or nearly all supply was needed. The economic slowdown in 1998 exposed such manipulation, most powerfully in the case of the Sichuan Ertan hydropower plant, and renewed central government focus on the need to enforce the separation of ownership between generation and grid (“*changwang fenkai*”).

The Ertan hydroelectric power plant began construction in 1991 and, at an installed capacity of 3.3 GW, was the largest of its kind in Asia. A product of the investment and ownership devolution trends discussed in this chapter, Ertan was jointly financed by the central government-owned State Development Investment Company, Sichuan Provincial Power Investment Company and Sichuan Provincial Power Company, with equity contributions of 48 percent, 48 percent and 4 percent respectively. The dam’s plant was designed to generate 17 billion KWh of electricity annually – equivalent to about one-third of Sichuan province’s annual power supply. The majority of the dam’s output was to be delivered via high-voltage transmission lines to Chengdu, the capital of Sichuan province, and burgeoning Chongqing, at the time a major Sichuan municipality of 30 million people at the upper end of the Three Gorges dam reservoir. Nine additional provinces would receive the remainder. According to the power purchase agreements

between Sichuan Provincial Power Company and Chongqing Municipal Power Company, signed in 1998, the contracted offtake amount in 1998, 1999 and 2000 equalled 0.98 TWh, 6.63 TWh and 9.31 TWh respectively.

The actual quantity of power purchased in 1998 and 1999 fell far below the contracted amount, registering at 0.75 TWh and 4.984 TWh respectively.<sup>170</sup> Between 1998 and 2000 the dam was producing at 41 percent capacity, resulting in a loss of RMB1 billion in 1999, and surpassing that figure in 2000. According to economist Hu Angang's calculations, the dam lost RMB3.51 billion to RMB6.83 billion in potential revenue.<sup>171</sup> By 2003, the plant was unable to service its debt, and the \$2.2 billion project was subsequently forced to turn to the Sichuan branch of the Bank of China for a \$396 million loan to repay a portion of World Bank debt and commercial investors.

By the time that Ertan began generating power in 1998, two important variables had changed since the start of construction in 1991. On the political side of the equation, Chongqing had, during Ertan's construction, been elevated to provincial status in 1997. This shift not only enabled Chongqing to refuse political pressure from the Sichuan provincial government to purchase power from Ertan, but also allowed the city to increase utilization of its own plants – and therefore its own revenue sources. Dispatching conflicts between the two provincial level entities were frequent.<sup>172</sup>

Relatedly, on the economic side, the chronic power shortages of the 1980s and early to mid-1990s were attenuated in some regions in 1998 with the onset of the Asian financial crisis and a slowdown of Chinese economic growth from over nine percent to

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<sup>170</sup> See <http://www.threegorgesprobe.org/TgP/print.cfm?ContentID=1331>.

<sup>171</sup> Angang Hu, "Ertan shuidian xiangmu yanzhong kuisun de yanjiu baogao", *Zhongguo guoqing fenxi yanjiu baogao*, vol 27, 2000.

<sup>172</sup> Interviews CD-11, CD-6.

approximately seven percent. As previously stated, quarterly export growth rates, year-on-year, declined from above eight percent in the first quarter of 1997 to near zero percent in the first quarter of 1999. Corresponding figures for electric power generation match this movement, declining from five percent in the first quarter of 1997 to near zero percent by the second quarter of 1998.<sup>173</sup> Power generation utilization rates had also bottomed out from above 5,000 hours in 1994 to below 4,500 hours by 1998. More importantly, local investment and ownership growth in power generation had begun to supply local demand. Chongqing, the largest planned customer for Ertan's power, had agreed to purchase 32 per cent of the output, yet by 1998 was less desperate for power.<sup>174</sup> The municipality was experiencing reduced economic demand, like many other contracted Ertan customers, but also had begun constructing municipally-owned and municipal power employee-invested power plants within the city. In addition, within Sichuan itself, the SPCC's regional subsidiary was privileging the dispatch of plants that were fully owned by the provincial government rather than Ertan, which was a joint investment between the central and provincial government financed together with the World Bank.<sup>175</sup> Ertan's power was cheaper than these local sources, at RMB 0.18 per kWh, yet contracts were not honored.<sup>176</sup>

The "Ertan Incident" powerfully illustrates how the successful diversification of energy investment and ownership to include the local level can also produce significant local protectionism and major conflicts in interest between investors at varying levels of government, particularly once economic growth rates moderate and major energy

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<sup>173</sup> NBS, China Economic Yearbook, multiple years; Woo, p.6.

<sup>174</sup> James Kyng, "New Doubts over Chinese Plant", *Financial Times*, March 10, 2000.

<sup>175</sup> Ci Zhang and Thomas Heller, "Reform of Chinese electric power market: economics and institutions," PESD Working Paper #3, January 2004, p.36.

<sup>176</sup> "Shocking Times in PRC Power", *Business China*, Sep 24, 2002.

shortages subside. The deterioration of electric power demand in 1998 exposed the inefficiencies created by the political channelling of energy resources along ownership lines. The resulting scale of Ertan's economic losses revealed the dysfunction of such an approach to central government regulators within the State Council – in particular Premier Zhu Rongji – leading to the launch of an investigation into the SPCC and market distortions in the industry.<sup>177</sup> This investigation was a critical early factor in the eventual dismantling of the SPCC and the ownership separation of grid and generating assets beginning in 2003.

*The Firm Perspective of State/Firm Interaction: Two Case Studies*

This chapter provided a framework for understanding China's industrial organization of its energy market by linking the interventions of the central government to cycles of stress on national energy supply. The resulting investment and ownership structure of China's coal and electric power generation industries over time is cyclical. The liberalization of investment and ownership in these industries, so critical to growth, did not result in the incremental replacement of firms owned by the central government by firms owned by private actors or local governments. Recent data reinforce this conclusion. Economic growth in the post-2002 period has witnessed a resurgence in the share of Central State Mines (CSMs). Electric power generation assets of the former SPCC, owned by the central government and reconstituted into the "Big Five" generating companies, contribute over 40 percent of total installed capacity and have begun to consolidate local government and private/semi-private firms (as the following case studies will analyze in detail).

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<sup>177</sup> Angang Hu, "Ertan shuidian xiangmu yanzhong kuisun de yanjiu baogao", *Zhongguo guoqing fenxi yanjiu baogao*, vol 27, 2000. Interviews B-19, B-33, B-48.

Now that cyclical patterns of governance and industry evolution have been established, it is important to examine the mechanisms through which state and firm interact to determine the shape of this evolution. The following two case studies address such mechanisms through close analysis of the rise of two local electricity generation firms. Both are major, rapidly growing firms initially owned by local government actors that were financed through a mixture of private and local public investment. Both are targeted by central actors (sometimes government, sometimes corporate) for consolidation and are reformed. The first firm persists, managing to maintain its range of owners and fundamental corporate integrity while the other is fully re-nationalized by the central government.

## CHAPTER THREE

### Case One The Jinyuan Group: A Local Firm's Persistence

#### *Introduction*

As discussed in the previous chapter on industry, local energy actors were clearly transformed by reforms. These reforms sought to liberalize financing sources, corporatize assets in China's energy sector, partially separate government regulatory functions from corporate functions and management, and ultimately dismantle vertical corporate structures (in the case of electric power generation). The prior discussion employed the industry level of analysis to build a framework to identify institutional cycles of energy governance, patterns of economic and energy growth, and resulting ownership and investment patterns in China's coal and electric power industries. This chapter adopts the firm level of analysis to shift the focus away from the state and industry and toward specific firms to identify the mechanisms by which these policy changes were executed and the strategies firms utilized to adapt to, and in some cases shape, such policies.

This first of two case studies is fascinating, as it provides evidence of how a local firm – the Jinyuan Group – created the opportunity to grow dramatically during one of the very periods of investment and ownership centralization that had been discussed in Chapter Two. Jinyuan took advantage of a major drive of central government industrial policy that began during the slowdown of 1998 and became a pivotal actor in the execution of that policy. The case study therefore provides compelling evidence of how goals of the developmental state (capital agglomeration and rapid industrialization) were achieved through liberalization measures that pluralized investment and ownership. The

firm also survived repeated attempts to consolidate its assets with the SPCC and other attempts to nationalize its assets. While Jinyuan ultimately did accept investment from one of the “Big Five” central government-owned generating firms through forced consolidation, the firm’s governance structure and original shareholders remained largely intact. As a result, the case also highlights how many of the major hybrid firms that grow out of post-centralization consolidation efforts are not carbon copies of the traditional SOEs that existed pre-liberalization.

#### *A Local Firm’s Rise*

One of the most intriguing cases of change in China’s energy landscape is the rise of Jinyuan Group in Guizhou province. Jinyuan began as a small private enterprise in one of the poorest provinces in China and grew rapidly to coordinate, structure, finance, and lead the build-out of electric power production for a cornerstone program of the “Develop the West” campaign – arguably the largest central state-led national development directive to be issued by Beijing in the past three decades. The case reveals the new types of firms and firm behavior resulting from such reform – “hybrid firms” leveraging government and private resources that are producing complex governance challenges for China’s ever emerging regulatory institutions.<sup>178</sup> Most importantly, the institutional evolution of Jinyuan as a private and largely independent energy firm for the majority of its history shaped the manner in which the central state reasserted its authority in the form of limited investment that preserved much of the firm’s original governance, institutions, and ownership structure. This model of state involvement stands in sharp

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<sup>178</sup> Firms that are either initially formed through the combination of private and government capital or partially listed on stock exchanges yet majority government-owned, have been termed “hybrid” or “dual” firms by recent studies. Please see Victor and Heller, 2007.

contrast to the effective nationalization of Luneng Group, a case treated in the subsequent chapter of this study.

The Jinyuan Group began with the creation of a technically private power generation firm, founded by Xiang Dehong, a 44 year-old president who, significantly, was also the party secretary of Guizhou's Provincial Power Company (GPPC). Jinyuan was founded with an initial investment of RMB500 million in non-state equity collected from what grew to become a group of 28,726 SOE employees. Within a short span of 7 years and after several changes in legal corporate form, by the end of 2008 Jinyuan was producing over 55 percent of electric power for Guizhou province and enjoying sales revenues of over RMB10.3 billion, catapulting it to the top tier of electric power firms in China.<sup>179</sup> To put this in perspective, this revenue figure is over an eighth of Huaneng Power International's 2006 figure, despite the fact that Huaneng is the largest power generation company in China, has been operating for well over two decades, and was carved out from the dismantled national SPCC.<sup>180</sup>

Jinyuan has also built a significant installed capacity of power (equaling 8GW, with rights to another 2GW), manages over 1GW of capacity owned by competitor firms, produced over 48.5 billion kWh of electric power in 2007, and served as the main electricity source for the Southern Line of the state-led West to East Power Transmission Program (WEPTP).<sup>181</sup> The total generating capacity under management surpasses that of Israel and Singapore, and is approximate in size to the national capacity of Vietnam or Hong Kong. Total assets as of 2008 equaled over RMB40 billion, about the size of

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<sup>179</sup> Guo Jianhu, Zhongguo Dianli Xinwen Wang, "Jinyuan jituan shangbannian 200yi dianliang 'xidian dongsong'", July 18, 2006. <http://www.china5e.com/news/power/200607/200607180143.html>.

<sup>180</sup> Huaneng's operating revenue in 2006 was RMB84.5 billion. [http://www.chinadaily.com.cn/bizchina/2008-03/27/content\\_6568871.htm](http://www.chinadaily.com.cn/bizchina/2008-03/27/content_6568871.htm).

<sup>181</sup> Jinyuan Group, "Yixin yiyi meifazhan, 2008 nian jinyuan jituan gongsi xinnian heci", January 2008.

Tangshan Iron and Steel, or Li and Fung of Hong Kong.<sup>182</sup> The WEPTP is one of the central government's largest infrastructure programs during the Tenth Five Year Plan (FYP) and was designed to secure electricity for Guangdong by encouraging power generated in Yunnan, Guizhou, and Guangxi to be transmitted east. The project is on schedule to be completed by 2020.<sup>183</sup>

Jinyuan's central role in the building of the WEPTP is important for two primary reasons. First, despite the national scale and regional integration of the WEPTP, the design and execution of the policy implementation were left largely in the hands of provincial level corporate actors. In the case of Guizhou, a provincial government joined with an active SOE party secretary who then established a private energy corporation and played a critical role in initiating, negotiating, and executing the many thermal power projects supporting the central government's broad development policy. Second, while limited investment originated through transfers from the central government, much of the equity financing was raised and deployed by provincial governments and corporations.

Perhaps most improbably in the context of the electric power industry, Jinyuan Corporation was created through the pooling of private domestic capital. This occurred despite the opaque regulatory issues related to private capital in the energy sector. In sum, this major infrastructure drive was designed by Beijing to integrate regional infrastructure, yet the planning, execution, and financing of key aspects of the energy production side of the equation were guided by local corporate actors, initiated with local non-state equity, and strengthened through the strategic use of new legal and regulatory resources spawned by reform (such as the Company Law, the financing liberalization

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<sup>182</sup> Caijing, "Buyout Unplugs Another ESOP Power Firm", January 7, 2009.

<sup>183</sup> Please see Appendix I for the current, 2008 subsidiary structure of Jinyuan Group and list of plants owned or under management.

regulation, and the de-verticalization of the industry structure). Firms such as Jinyuan, while increasingly powerful, should not be understood as fully independent from the local and central state and wholly commercial, as some argue, but rather understood as actors recombining these resources of the central state through national policy directives, and national legal and regulatory changes, and local state protectionism. Perhaps most significantly, these firms do so under an opaque regulatory environment, a high risk of nationalization or state intervention, and the investment of major sums of capital.

### Modest Origins

Guizhou province is, in many respects, the last environment in which one would expect to witness innovation and entrepreneurialism in the state sector, or the rapid growth of economic activity by non-state or quasi-state firms. The nation's miraculous growth of the past three decades has largely circumvented the majority of Guizhou's populace, with a per-capita GDP that ranked lowest in the nation in 2008.<sup>184</sup> What little economic growth has been generated in the past has been the result of large amounts of state-led investment. As scholar Tim Oakes has rightly pointed out, "[w]ith 84 per cent of GVIO [gross value of industrial output] coming from state-owned enterprises (nearly twice the national average), Guizhou's economy continues to be the most state-dominated of any provincial-level jurisdiction in China."<sup>185</sup>

In contrast to its low level of economic wealth, Guizhou was blessed with a concentration of China's natural resource wealth – particularly hydroelectric potential and coal reserves. The province ranks fifth in national proven coal reserves, and third in hydroelectric potential. Theoretical hydroelectric capacity equals approximately 18.57

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<sup>184</sup> NBS, China Statistical Yearbook 2009, through China Data Online, accessed May 21, 2009.

<sup>185</sup> Tim Oakes, "Building a Southern Dynamo: Guizhou and State Power", *China Quarterly*, 2004 p. 470.

GW, with viable capacity of 16.83GW. While an abundance of physical resources have long been present in Guizhou, the organizational, financial, institutional and legal resources to develop such resources were historically absent. The province's energy sector historically reflected afflictions that plagued coal-rich areas throughout China: a highly fragmented coal market, a monopoly on the production and distribution of electric power, low energy prices that stifled investment, and lack of electric power supply that resulted in intermittent shortages, brownouts, or blackouts that remained despite decades of policies and investments designed to address such failure.

By the beginning of the 21<sup>st</sup> Century, much had changed in Guizhou's energy landscape. With the growth of the electric power industry contributing the largest quantity of gross industrial value-added in the province (at 26.1 percent in 2006), total coal production more than doubled from 31.9 million tons in 1999 to 76.6 million tonnes by 2005.<sup>186</sup> Thermal power production nearly tripled from 20,918 billion kWh to 56,957 billion kWh in the same short six year period.<sup>187</sup> In the first four months of 2006, the power grid reached electricity output of 22.9 billion kilowatt-hours, increasing 33.7 percent year on year – nearly 3 times that of the nation's average growth of 12.6 percent. Such expansion proved puzzling to many observers, who questioned how a continued pattern of state owned investment could lead to such a dramatic surge in economic activity. Moreover, the surge in growth was increasingly reflected in improved local fiscal conditions. The Guizhou provincial government revenue more than tripled from RMB7.4 billion in 1999 to RMB22.7 in 2006. The GDP of the province more than

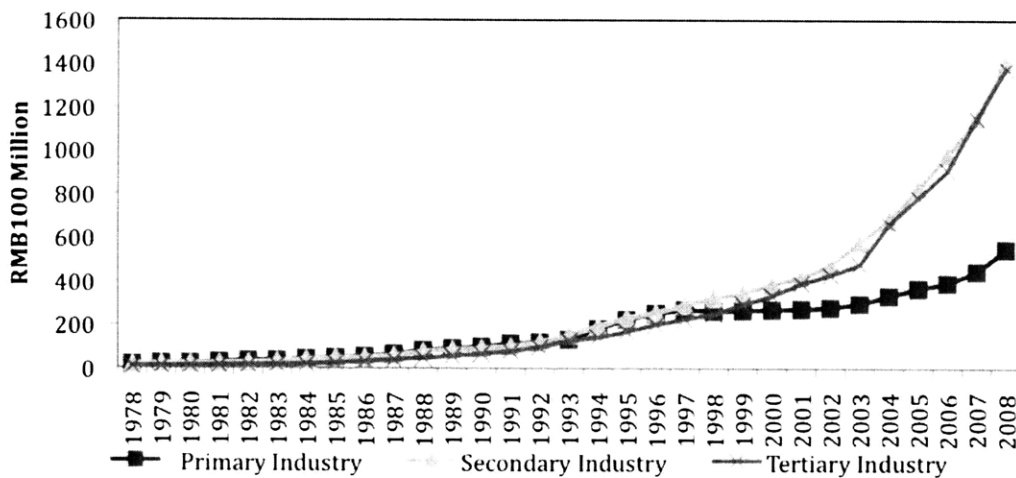
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<sup>186</sup> Guizhou Statistical Yearbook, 2007; supplementary data available online  
<http://www.tdctrade.com/mktprof/china/guizhou.htm>

<sup>187</sup> NBS, China Energy Statistical Yearbook, 1997-1999, p. 445; NBS, China Energy Statistical Yearbook, 2006, p. 221.

doubled from 91.2 billion in 1999 to an estimated RMB228.2 billion in 2006.<sup>188</sup> In sum, after several decades of fairly low economic growth, Guizhou began to revitalize in the mid 1990s, largely as a purveyor of value-added energy resources and services to neighboring centers of dynamism, particularly Guangdong province. Such change proved difficult to explain at the macro level, as the metrics of state/non state ownership levels did not evince major shifts during this time and the “heavy hand” of state-led development seemingly remained in the form of this national directive.

**Figure 25. Guizhou GDP by Industrial Category**



Source: China Data Online, 2009.

An Opportunity from the Center

For a region long dominated by ineffective central state investment, the largest opportunity for local economic growth in Guizhou ironically came in the form of a January 2000 central directive to “Develop the West” (*xibu dakaiifa*).<sup>189</sup> This national

<sup>188</sup> China Data Online, 2008.

<sup>189</sup> See David Goodman, “The politics of the West: equality, nation-building and colonization,” *Provincial China* 7, no. 2 (2002): 127–150, “The Campaign to “Open Up the West”: national, provincial-level and

development drive has been criticized on many grounds, not least of which was the charge that the infrastructure projects spearheading the policy blocked local actors from participating in the value-creating activities that resulted.<sup>190</sup> For Guizhou, this rather vague directive combined with a more specific subset of policies that sought to fuel coastal energy needs through the utilization of natural resources from the interior provinces. This second policy, named the “West-East Power Transmission Project” (*xidian dongsong*), served as the primary vehicle through which the bulk of the infrastructure construction was launched at the end of 2000.

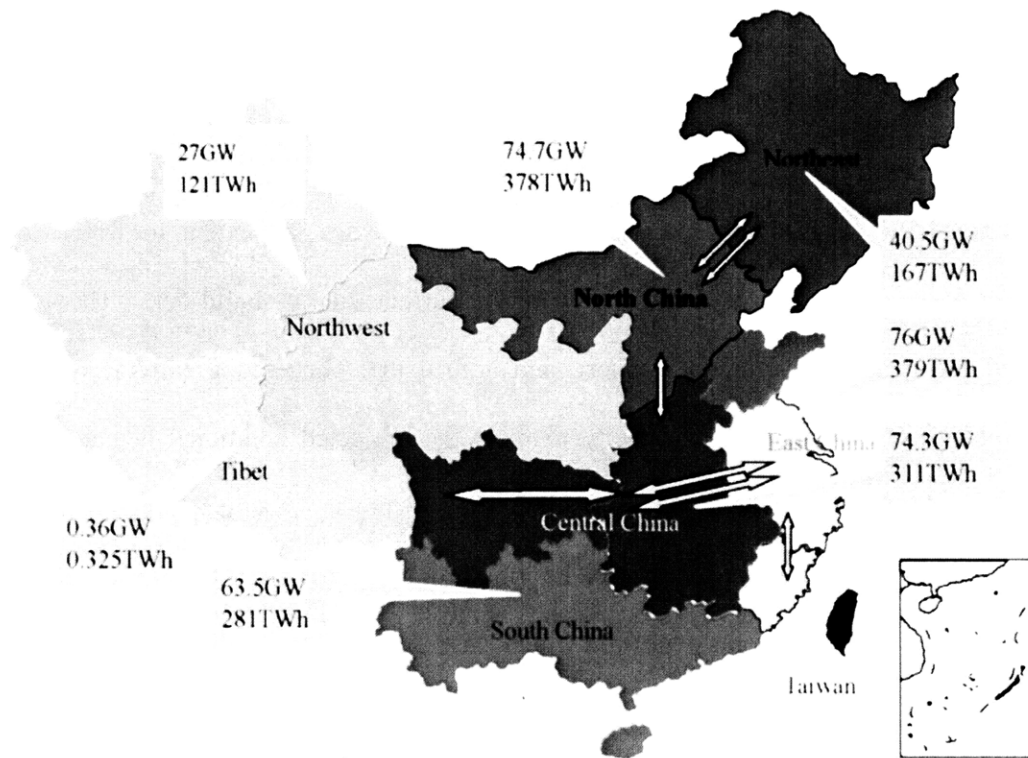
The development effort was organized into Northern, Central, and Southern transmission lines that brought electric power produced in resource-rich, demand-poor western regions of China to the demand-rich, resource-poor coastal regions. The Southern line enabled the southwestern provinces of Yunnan, Guizhou, and Guangxi to supply power east to Guangdong. The plan called for power to be produced by planned thermal plants in Guizhou and Yunnan provinces, as well as hydropower plants built along Guizhou’s Wu river, the Lancang river in Yunnan, as well as the Nanpan, Beipan, and Hongshui rivers that run through Guizhou, Yunnan, and Guangxi. A total of six transmission lines were planned to be completed by 2010, with a capacity of 10 GW. By the end of 2007, over 7GW of capacity had been completed along four lines and the project was on schedule for a timely completion. Capacity plans for 2020 equaled approximately 20GW.

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local perspectives,” *The China Quarterly* 178 (2004): 317–334, and *China's regional development* (Routledge, 2008).

<sup>190</sup> BBC Summary of World Broadcasts, May 5, 2000. “Economists Urge Prudence in Developing West”; Asia Pulse, April 5, 2000. “Asia Economist Suggests New Ways for Developing the West”.

**Figure 26. Three Major Areas of Electric Power Transmission**



Source: Global Energy Network, 2004.

*“Big Push” Development Goals through Liberalization Means:*

*Top-Down Slogans, Bottom-Up Execution*

It is significant to note that the senior government leaders of Guizhou’s energy sector first learned about the details of the West to East Power Transmission Program not through mandates and formal government communications from Beijing but through the fortuitous receipt of a copy of corporate correspondence between the Beijing headquarters of the State Power Corporation of China (SPCC) and its provincial subsidiary firm in Guangdong.<sup>191</sup> Moreover, the communication was bottom-up in nature and initiated by the subsidiary firm. The April 2000 report from Wu Xirong, then-

<sup>191</sup> Interviews G-7, G-10, B-19, B-32.

president of Guangdong Provincial Power Company, to Gao Yan, then-president of SPCC, explained how Guangdong's own estimates calculated a power deficit of 20GW during the 10<sup>th</sup> Five Year Plan (FYP) (2001-2005). While national estimates of energy needs and infrastructure goals are often based on the aggregation of local data, an additional 20GW is a large scale of need and expresses the extent to which local information and action is critical to China's current energy build-out. The report requested central government support, and argued that Guangdong Provincial Power Company should build such capacity to meet the projected additional demand. The Guizhou Provincial Power Company (GPPC) Party Secretary, Xiang Dehong, received a copy of this report and viewed the neighboring province's deficit as a major opportunity to catalyze the growth of his own firm, which was also a direct subsidiary of the SPCC.<sup>192</sup>

Rather than allow the deficit's solution to be determined through negotiations between the SPCC, its Guangdong subsidiary, and the central government, Xiang Dehong drafted a report entitled "Guizhou Sends 3GW of Power to Guangdong during the 10<sup>th</sup> FYP" and sent it to the Guizhou Party Committee, the Guizhou provincial government, and the SPCC headquarters in Beijing. The initial reaction from all parties was silence. The Guizhou provincial government itself initially viewed such investment as highly risky, as it depended on a projection of energy demand in a neighboring province that may decide to produce power locally. Local leaders also remained wary of the low electric power tariffs yielded by the market at that time.<sup>193</sup> The SPCC also remained silent. Senior SPCC executives assumed that such a lucrative large scale infrastructure project would be carried out by Guangdong itself and believed that transmission lines

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<sup>192</sup> Xiang had joined the company in 1993. Xiang Dehong (ed.), *Dakuayue: Guizhou Dianli Jueqi*, (Guiyang: Guizhou Renmin Chubanshe), March 2007, p.471.

<sup>193</sup> Interviews G-15, G-2, G-6, B-28; Xiang, p.471.

between Guizhou and Guangdong would require time horizons incompatible with Guangdong's needs.<sup>194</sup> Xiang persisted, however, and eventually the Guizhou Party Secretary, Chen Dawei, supported the report and suggested that "urgent" (*"jinji"*) be added to a subsequent document. The report was then sent to the SPCC corporate headquarters in Beijing.

The mid-2000 proposal by GPPC was both ambitious and seemingly ill-timed. GPPC argued in the early drafts of the proposal that it would be able to provide 3GW of power (and in later drafts 4GW of power) to Guangdong during the 10<sup>th</sup> FYP. The firm was committing to do so despite the absence of key political, financial and material resources as well as the clearly negative investment environment of the electric power sector at that time. Financially, GPPC lacked the resources necessary either to fund fully the construction of such capacity itself or to put forward the equity necessary to secure loans from the major commercial banks. In addition, initial discussions with the China Development Bank regarding repeated loan requests proved fruitless. Second, GPPC's parent firm, the SPCC, emphasized repeatedly that it remained unwilling to invest in power generation because of impending regulatory reforms that would initiate a separation of generator and grid assets and prohibit power transmission and distribution firms from owning and operating generation facilities. Third, the investment environment for power generation remained depressed. As discussed in Chapter Two, by the year 2000 electric power was still in surplus. On-grid power prices were therefore quite low and 1998 regulations curtailing the construction of smaller scale power generation units by Premier Zhu Rongji dissuaded many commercial banks from lending

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<sup>194</sup> Interview G-19.

to such projects.<sup>195</sup> This environment was reflected by the unwillingness of existing Guizhou firms to expand capacity themselves. For example, since its establishment in 1990 until 2000, the major firm Wujiang Hydro Corp. had not built one new power plant. As economic growth in Guangdong clearly began to return during the end of the 1990s, there was an additional concern that investment in the transmission grid necessary to send such additional power from Guizhou to Guangdong may not be the most profitable use of such funds.<sup>196</sup> Lastly, the ability of the central government to enforce the shut down of existing Guangdong based generation facilities – many highly polluting oil-fired plants – was repeatedly questioned. Given such uncertainty, it remained unclear whether Guangdong would halt the local build-out of such capacity.

Building energy facilities on any scale, given such a lack of resources, uncertain policy horizons and the questionable investment environment, would have proven to be a difficult endeavor. However, the large scale of the proposal was also highly ambitious for a company with such limited means. The stated goal was to expand total power generation in Guizhou from 5GW to 11GW in only five years. This additional 6GW of power was comparable to the size of the national power system of Nigeria or Ireland in 2005, or more than the amount of national capacity that Australia, Germany, Thailand or Vietnam added in a similar period of time.<sup>197</sup> In local terms, such a feat would require producing more capacity in five years than what had been produced in over 50 years of economic activity in the province. From the founding of the People's Republic in 1949

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<sup>195</sup> On August 13 1999, the State Economic and Trade Commission (SETC) issued the *Commercial and Industrial Investment Sector Catalogue to Halt Redundant Construction*, a list of 201 categories of projects to be banned starting September 1, 1999 and compiled by the SETC's Industrial Policy Department. In particular, items 118 and 155 specifically banned the construction of any coal-fired power generating units with capacity of 100MW or less.

<sup>196</sup> Interviews G-16, B-9.

<sup>197</sup> The time period for this comparative data is 2001-2005. US DOE, Energy Information Agency, *International Energy Outlook 2006*.

through to 1997, total Guizhou investment in coal production equaled RMB4.3 billion. Yet even one 1.2GW thermal plant required investment of about RMB4.8 billion.<sup>198</sup> Expansion on multiples of this scale would require total investment of approximately RMB30 billion. According to national regulations a minimum of 20 percent of the total investment must be in the form of equity in order to receive bank loans for the remaining investment needs. The resulting total of approximately RMB6.1 billion of required equity would therefore be difficult to raise, given the investment climate and limited financial resources of the province. Undeterred, GPPC and the Wujiang Hydroelectric Development Corporation did attempt this approach, and were able to raise an impressive, but insufficient, RMB4 billion.

*“Reforms Open Doors, Firms Walk Through”*

In response to the projected power needs of Guangdong, the lack of domestic financial resources, and the depressed investment climate of the time, GPPC pursued four avenues of financial and administrative innovation to secure the resources and build the projected capacity.<sup>199</sup> First, Jinyuan took advantage of the dismantling of state financing controls and the corporatization of energy assets that had begun in 1985. Accordingly, GPPC first broadened its sources of financing mechanisms by collecting “social funds” (*“shehui zijin”*) that consisted of investments from individuals and employees, to provide initial equity for the initial loan to create the Jinyuan Company.

Second, the firm took advantage of the partially executed second round of reforms that were occurring at this time, namely the separation of regulatory function from corporate management. This reform was less a dismantling, which is arguably easier to

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<sup>198</sup> Xiang, p.515.

<sup>199</sup> Ibid., p.547.

execute, and more an active restructuring to strip the corporate management responsibilities from the government function responsibilities within these firms. GPPC took advantage of this delayed and partially enforced reform by utilizing its status as an SOE with continued responsibility for certain state regulatory functions by improving enforcement of the collection of the provincial electric power fee – a budget deficit that totaled an incredible RMB1.8 billion in uncollected fees in 2000 alone.<sup>200</sup> These fees mostly related to registration, expansion permits, and documentation expenses. Third, the firm joined several traditional formal competitions for direct central government funding related to the “Develop the West” campaign. Fourth, given the pluralization of financial actors now able to participate in the power generation, “outside” investors were consciously courted, ranging from other electric power generators in other provinces to firms in related industries such as natural resource exploitation or building and construction.

Overall, the economic opportunity was made apparent to these local actors through reform proclamations from the central government that signaled over time the coming of the third round of reform – de-verticalization of the electric power industry’s semi-monopoly structure. The SPCC would divest its generation assets and such assets would be merged with separate, independently managed power generation corporations. The arrival of such corporations provided an opportunity for local resources to be reorganized as such reforms began to take hold.

#### *Provincial SOE as Broker and Negotiator*

GPPC (and what became the Jinyuan Group) sought to provide two-thirds of new provincial power capacity brought online as part of the WEPTP’s first phase program,

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<sup>200</sup> Ibid., p.549.

entitled “Four Hydro, Four Thermal” (“*sishui sihuo*”), and second phase program, entitled “Four Hydro, Eight Thermal” (“*sishui bahuo*”). During this early period of time in 2000, Yunnan province was only capable of sending 600MW of power capacity to Guangdong. Guangdong lacked peaking power only, and the provincial government was willing to contract power for a relatively inexpensive price of RMB0.157/kWh. While Yunnan Provincial Power Corporation balked at the low price and sought to raise it through protracted negotiation, again reflecting the importance of local actors, GPPC indicated that it was willing to provide the power at the asked price, and moreover would be able to send 3 GW of capacity initially, 4 GW in the near term, and 8 GW by the beginning of the 11<sup>th</sup> FYP (2006-2010). While the generation side of the ledger would be supplied by Jinyuan, another corporation would have to become involved to expand the transmission grid as necessary to send the additional power to Guangdong.

SPCC’s subsidiary, the China Southern Power United Company (Nanfang Dianli Lianhe Gongsi, currently a subsidiary of China Southern Grid Company), was a firm that operated the 500kV transmission line that linked Guizhou to Guangdong and Hong Kong. Southern Power’s president, Yuan Maozhen and Xiang of GPPC met in early 2000 to discuss the manner in which the grid could be expanded to accommodate Guangdong’s expansion plans. Xiang explained how the initial 4MW of capacity could be sent through the combined use of four different lines. The first was a 500kV D/C line linking Anshun to Guangdong; the second and third were two separate 500 kV A/C lines from Qing Yanjing Guangxi reservoir to Guangdong, and the fourth was the original 500 kV line linking Tiansheng hydro stations to Guangdong.<sup>201</sup> Yuan agreed to the configuration.

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<sup>201</sup> Ibid., p.474. Sinocast articles 2001, 2002, 2003.

Several months after this agreement between GPPC and China Southern Power United Company had been finalized, and as Beijing was announcing initial execution of WEPTP programs of the “Develop the West” policy, SPCC Vice-Chairman Kuang Zhongxiong convened a separate parent company plenum to discuss how to resolve the Guangdong electricity shortage in the 10<sup>th</sup> FYP and deliver these initial WEPTP projects. The SPCC had received reports sent from Guizhou regarding the negotiations and detailed planning between Guizhou and Guangdong. Kuang offered three “opinions” regarding next steps that essentially supported the plan as designed by the provincial actors. First, he argued, Guangdong had no choice but to rely on thermal power plants, as the Guangxi Longtan and Yunnan hydro stations would not be able to provide enough power until mid-way through the 11<sup>th</sup> FYP – this opinion was summed up with the phrase “Distant water cannot resolve proximate thirst” (“*yuanshui jiebuliao jinke*”). Second, building thermal capacity in Guizhou would be preferable to building units in Guangdong because Guizhou’s coal reserves were much richer and GPPC had already begun seeking financing and coordinating long term plans with the grid. Lastly, building thermal plants in Guizhou would fulfill both the central government policy goals of transmitting power west to east through the WEPTP and the transfer of wealth of the east to the west through the “Develop the West” campaign, thereby reducing regional inequality.<sup>202</sup> Such positioning was important, as it revealed how the interests of various groups of stakeholders were being met, from the central government agencies supporting the “Develop the West” policy directive, to the provincial governments in the western regions needing to provide power, to the companies seeking to implement the projects.

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<sup>202</sup> Interviews B-29, B-38, G-18, G-3, G-11. Xiang, p.474.

On August 1, 2000 the Guangdong provincial government also approved the 4GW plan for the 10<sup>th</sup> FYP, and the detailed plan received central approval from the SDPC. On August 23 Premier Zhu Rongji convened a State Council meeting to confirm the full 10GW plan as well as the 4GW Guizhou-related component of the overall agreement. By the end of the month authorization (*renke*) had been granted from the State Development and Planning Commission (SDPC), allowing the provincial power corporations of Guizhou and Guangdong to initial the overall agreement. The SPCC then approved a regional 10GW transfer plan, with a total of 4GW generated by Guizhou, 3GW generated by the Three Gorges plants, a slightly expanded 1.6GW generated by Yunnan, a more modest 0.6GW from Hunan's Liyu River hydro plant, and 0.8GW from Guizhou's Tiansheng stations 1 and 2 once planned units were brought online. Guizhou had captured the largest of the capacity contracts and rapidly began the build-out necessary to meet the rather hurried deadlines to bring the power online.

*Round 1 Reforms as Opportunity:*

*Accessing Financial Capital*

Obstacles soon began to accumulate. Despite the SDPC support of the overall plan, the majority of the GPPC's specific plants were denied approval by the central government. Nayong plant (4x300MW), Anshun plant (2<sup>nd</sup> phase, 2x300MW), and Jinsha plant (2<sup>nd</sup> phase, 4x300MW) were all deemed "black" (illegal) by the SDPC and construction was not legally allowed to begin. Building continued, however, as the Guangdong agreement had been signed and evidence of strengthening demand in the east began to concern provincial leaders in Guangdong.

While the plants remained unapproved, they still received considerable praise and attention from elite central government policymakers who viewed them as critical to the larger industrial campaign to “Develop the West”. During his visit to Guiyang in 2000, then-Premier Zhu Rongji expressed his belief that Guizhou should contribute greatly to the nation’s development, specifically through the production of electricity. SDPC Minister Zeng Peiyan visited Guizhou in September 2000, expressing his support for Guizhou and arguing that the province serve as the core of the West to East project, stating: “The WEPTP is the symbolic engineering feat of the larger Develop the West Campaign, and while the two provinces of Yunnan and Guizhou are the key pillars of the Campaign, Guizhou remains the more important.”<sup>203</sup> Minister Zeng reportedly inquired as to whether bidding had taken place, was reassured by the provincial government that this had already occurred, and returned to Beijing.

Yet the problem of financing such projects remained. On August 31, 2000, citing the 1986 regulation to encourage investment in the power industry, the GPPC submitted a petition to the Guizhou provincial government, offering three avenues for financing the initial stages of the WEPTP project.<sup>204</sup> The three solutions proposed were to: i) expedite the public listing of Qianyuan Power Corporation on the Shenzhen stock exchange, thus gaining the financing necessary for construction of some units of the initial 2x120MW Nayong plant; ii) expedite cooperation talks with Zhonghua Power of Hong Kong regarding possible joint investment in the second stage build out of the 2X300MW

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<sup>203</sup> *Xidian dongsong shi xibu dakaifa de bioazhixing gongcheng, shishi xibu dakaifa gongcheng zhongdian zai yungui liang sheng, yungui de zhongdian you zai guizhou*. Xiang, p.476.

<sup>204</sup> Regulation cited was the "Provisional Regulations on the Encouragement of Fundraising for Power Construction Investment and Implementation of the Multi-Rate Power Tariff". 1985 regulation entitled: “*Guanyu duo qudao chouji guizhou dianli jianshe zijin de qingshi*”, then highlighted and invoked in 2000 at the provincial level through a new regulation entitled “*sheng renmin zhengfu guanyu jiakuai dianli jianshe shishi xidian dongsong youguan juti wenti de tongzhi*”, no. 45. [http://gb.cri.cn/1827/2004/09/07/405@292474\\_1.htm/](http://gb.cri.cn/1827/2004/09/07/405@292474_1.htm/).

Anshun plant; and iii) collect financing from interested employees of GPPC itself to invest in several plants simultaneously, including Qianbei, Nayong, and Anshun.

The first solution was eventually rejected, as the listing process for the Shenzhen exchange could very well have carried into 2004 and critically delay the construction of the majority of power capacity to be sent to Guangdong. The second solution would only resolve financing for one aspect of the generation challenge – the second stage of Anshun plant’s total 2x300MW project. While such a stopgap measure was viable, it would not address the majority of the current need. However, the third solution was viewed as clearly laden with risk, given the ambiguous ownership regulations relating to “lifeline” industries such as electric power. On Sep 22, 2000 the Guizhou provincial governor’s office therefore held a comprehensive meeting to review the options, issuing a notice titled: “Guizhou Provincial Government Notice of Specific Questions Relating to Expediting WEPTP Power Construction Measures”.<sup>205</sup>

Weeks before, the provincial labor union met and chairman Wang Duilin agreed to establish the Guizhou Provincial Power Company Employee Shareholder Group (*guizhousheng dianli gongsi zhigong chiguhui*).<sup>206</sup> Guizhou governor Qian Yunlu also convened meetings to investigate the regulatory implications of establishing such an entity, and later joined four vice governors in signing (*qianpi*) a regulation allowing the Electric Power Employee Shareholder Group to be created.<sup>207</sup> In addition, the governor’s commission concluded that, through the 1993 Company Law and its 1996 revision, the Provincial Power Corporation could explore the status of creating that the law termed a

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<sup>205</sup> Notice again entitled: “*Guizhousheng renmin zhengfu guanyu jiakuai dianli jianshe shishi ‘xidian dongsong’ you guan juti wenti de tongzhi*”.

<sup>206</sup> Zhang Shaojing, “Jinyuan zhilu”, *Zhongguo Dianli Qiye Guanli*, May 2005 volume, p.36; Xiang, p.479.

<sup>207</sup> Interview G-22, G-31.

“natural person status shareholding company” (*ziranren yidao faqi sheli gufengongsi*), or a firm with a shareholding structure and the legal rights of a natural person.

The vice chairman of GPPC’s labor union, Wu Suimo, partially understood the risks of creating such an entity and of utilizing recent legal and regulatory changes. He stated in a later interview: “First, we feared it was illegal. Second, we feared that it carried major risk for the employees and their savings.”<sup>208</sup> The reasoning he then employed to explain why the decision was made to pursue the new legal form revealed the perceived advantages of conducting such financing through an SOE. He stated that, as the labor union was under the leadership of the CCP (Chinese Communist Party), and was therefore a “mass organization” (*shetuan zuzhi*) of the Party, other Power Corporation executives and employees believed that such funds could reliably be invested in an entity that represented their interests.

The funds from employees were collected in two rounds between October 2000 and May 2001. The first round secured RMB500 million, while the second round resulted in an additional RMB300 million, yielding the requisite RMB800million.<sup>209</sup> The collection was not mandatory or forced. Approximately 73 percent of employees participated, convinced by GPPC President Xiang Dehong’s argument that thermal power would remain the foundation of the West to East power transfer project. He reasoned that rising demand for electric power in south China, relative lack of power supply regionally, and central government policies that support the “Develop the West” campaign combined

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<sup>208</sup> Jin Longkun, “Wo Kan Jinyuan”, *Zhongguo Dianli Qiye Guanli*, April, 2005 volume, p. 9; Xiang, p.479.

<sup>209</sup> Xiang, p.480.

to ensure a projected return on investment no lower than 11 percent.<sup>210</sup> In all, a total of 28,726 people (“natural person investors” termed *ziranren touzizhe*) invested in Jinyuan.

*Second Round Reforms:*

*Separating Government Function and Corporate Function – Accessing Political Capital through Delayed Reforms*

On November 6, 2000, immediately following the first round of financing that had been completed in October 2000, Guizhou Jinyuan Power, Ltd.,<sup>211</sup> was established and approved by the Guizhou Industry and Commerce Bureau.<sup>212</sup> One month later, on December 7, 2000, the firm was renamed Guizhou Jinyuan Power Investment, LLC,<sup>213</sup> a legal evolution designed to clarify the purpose of the firm and allow investment for expanded power activity. Days later, Guizhou Jinyuan Power Investment, LLC invested the RMB500 million funds collected, along with RMB100 million from a consortium of smaller private firms (whose funds would be difficult to track), to establish and then control 78 percent of West Power Shareholding Ltd.,<sup>214</sup> which became the first subsidiary under Jinyuan Power Investment. West Power was designed specifically for managing thermal construction investment for Jinyuan’s power projects in Guizhou.<sup>215</sup> Two days later the WEPTP was officially launched through a ceremony in Guiyang and West Power began construction on Jinsha, Xishui, Qianbei and Nayong thermal plants.<sup>216</sup>

During this transitional period, the top five executives of GPPC, the provincial SOE firm, held similarly senior positions within Jinyuan, LLC, a private power generation firm. This clear conflict of interest allowed these individuals to remain in their

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<sup>210</sup> Interview G6, G3, G15.

<sup>211</sup> “*guizhou jinyuan dianli youxian zeren gongsi*”

<sup>212</sup> “*guizhou gongshangju*”

<sup>213</sup> “*guizhou jinyuan dianli touzi youxian zeren gongsi*”

<sup>214</sup> “*xidian gufen youxian gongsi*”

<sup>215</sup> Xiang, p.496.

<sup>216</sup> [http://english.peopledaily.com.cn/english/200011/09/eng20001109\\_54698.html](http://english.peopledaily.com.cn/english/200011/09/eng20001109_54698.html).

government positions and operate a vertically integrated grid and generating market, while also building up the competitive capacity of an independent firm that they owned. Such an arrangement created considerable incentives to have the grid grant preferential grid access to power generated by Jinyuan through dispatch ordering. The grid employees at GPPC thus were able to improve the assets that they own (Jinyuan) and in return gain wealth through ownership.

### *The Grabbing Hand from Above*

2001 brought market changes that served to strengthen the position of firms in the power generation industry, such as Jinyuan. First of all, electricity shortages began as economic growth emerged from the stagnation of the Asian Financial Crisis. Second, major infrastructure supporting projects relating to the “Develop the West”, and subsequently the WEPTP, began in earnest. Third, a shift in Guizhou coal investment patterns allowed growth of mine mouth plants opening in Guizhou, which began to reduce considerably plant production and transportation costs. As a result, on July 25, 2001 Guangdong governor Lu Ruihua led a delegation to Guizhou for a conference to address the issue of “Guizhou Power to Guangdong” (*“qiandian songyue”*). The estimates of transmission capacity additions were 1GW by 2002, 2GW by 2003, 3GW by 2004, and 4GW by 2005. An agreement entitled the “Guizhou-Guangdong Power Purchase Agreement” (*“qianyue liangsheng shougou dian hetong”*) was then signed by Guangdong Power Group president Wang Yeping, GPPC president Xiang, and SPCC Southern Company president Yuan Maozhen.<sup>217</sup>

As the production capacity and revenue of Jinyuan grew, the State Power Corporation of China (SPCC), which was the central government-owned parent company

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<sup>217</sup> Xiang, p.485.

of GPPC, began to take an increasing interest in the reforms emerging from the Guizhou electric power market. On April 26, 2001 the first direct conflict arose, in the form of a directive from the SPCC unilaterally requiring parent company construction approval of the Qianbei and Nayong plants already under construction. In subsequent discussions between GPPC and the SPCC, it became clear that the SPCC sought a direct transfer of 30 percent ownership of both plants.<sup>218</sup> Here it is significant to note that by October of the following year the President of the SPCC, Gao Yan, had disappeared from China under charges of corruption and abuse of state assets. In initial deliberations, the president of GPPC, Xiang Dehong, refused to transfer any degree of ownership of the plants, yet eventually agreed to cede controlling shares of Nayong Plant #2 and Yafu plant for a total of 1.2GW capacity to a consortium of the SPCC and its partner Shandong International Power, Ltd.<sup>219</sup> The SPCC reportedly countered that the terms had changed and demanded a 51% share of all capacity under GPPC.<sup>220</sup>

By September 19, 2001, SPCC President Gao Yan had sent a corporate directive to dispatch GPPC President Xiang to Sichuan province in an effort to increase leverage over its provincial subsidiary, GPPC. A SPCC delegation was sent to Guiyang on October 10, 2001. In the morning of October 11, Xiang Dehong began to present a report to the convened group in the GPPC's meeting hall regarding the WEPTP work that had been completed to date, the manner in which Guizhou was fulfilling the national "Develop the West" campaign, and other construction progress. He was then interrupted by the SPCC delegation head, who said this work was well known and that the matter of

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<sup>218</sup> Interviews G-9, B-27, G-4.

<sup>219</sup> "shandong guoji dianyuan kaifa gufen youxian gongsi"

<sup>220</sup> Jin Longkun, "Wo Kan Jinyuan", Zhongguo Dianli Qiye Guanli, April, 2005 volume, p. 9; Xiang, p.484.

the illegality of these projects had to be discussed immediately. The individual went further, arguing that use of employee funds to provide equity for such projects was irresponsible, as power investments were quite risky. One alternative, he argued, was clear: an SPCC regional subsidiary, Guodian Power Development, Ltd.<sup>221</sup> together with Shandong International, Ltd. would divide controlling shares in both the Nayong and Qianbei plants, as had been originally proposed by Gao Yan of the SPCC. Xiang Dehong responded that he appreciated such financial assistance, but that financing had been secured and no further partnerships were required to complete the plants.<sup>222</sup> Despite private negotiations that continued into the night, terms did not change and no agreement was reached. Several forms of protracted negotiations continued fruitlessly through November, 2001.

It is interesting to note that these technically “illegal” plants were continually lauded by representatives of the central government throughout their construction, and ribbon cutting ceremonies were often attended by such leaders. Despite lack of clarity over ownership rights and asset allocation, the SPCC and the SDPC of the central government sent delegates to the opening ceremonies of four thermal plants (Qianbei, Nayong, Anshun, and Guiyang) through November, 2001.<sup>223</sup> Such support continued, and once scale began to ramp up quickly, on March 6, 2003 national leader and CCP General Secretary (and former Guizhou Provincial Secretary) Hu Jintao visited Guiyang, reinforcing the importance of electric power development in Guizhou. He stated: “For Guizhou’s economy to emerge and take flight, it will have to rely on the electric power

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<sup>221</sup> “*guodian dianli fazhan gufen yoxian gongsi*”

<sup>222</sup> Zhang Shaojing, “Jinyuan zhilu”, *Zhongguo Dianli Qiye Guanli*, May 2005 volume, p.38.

<sup>223</sup> Jin Longkun, “Wo Kan Jinyuan”, *Zhongguo Dianli Qiye Guanli*, April, 2005 volume, p. 9; Xiang, p.490.

industry. Guizhou's electric power firms must grow and connect to related industries."<sup>224</sup> A week later, on March 15, 2003, Hu assumed the office of President of the PRC. Illegal or not, central government and corporate representatives presided over much of the expansion activities pursued by Jinyuan.

By November 26, 2001, the second phase of the WEPTP was launched through a formal opening ceremony presided over by SDPC Vice Chairman Zhang Guobao, Jinyuan president Xiang, Guizhou Party Secretary Qian Yunlu, Guizhou Governor Shi Xiushi, and Guizhou Vice Governor Chen Dawei. On January 9, 2002 the director of the SPCC Personnel Department flew to Guizhou with final papers ordering Xiang to Sichuan. However, Xiang was still the president and party secretary of GPPC, and therefore the party secretary of a provincial SOE. The transfer of an individual in such a position required the parent SOE to consult with the party secretary of the province in which the firm operates and is registered. In such cases there exists potential for considerable conflict, as the head of the national level SOE corporate Organization Department does not outrank the provincial party secretary. This double governance of cadres (*shuangguan ganbu*) thus creates difficult problems to resolve between entities of equal rank. Should disagreement persist, then the case must be reported up to the central government Central Organization Department, which all parties understood would invite widespread scrutiny of all transactions. In the case of Xiang Dehong's transfer, the Guizhou Party Secretary Qian made it clear that Xiang would remain in Guizhou.

*Third Round Industry Reform:*

*De-Verticalization as Threat, Move to Access Human Capital*

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<sup>224</sup> Xiang, p.549.

Such negotiations were taking place during a period of considerable central level regulatory reforms, as discussed in part one of the chapter. In particular, talks of the third round of reforms to de-verticalize the corporate structure of the power industry had begun. The SPCC was soon to be dismantled (on December 29, 2002), and to lose its semi-monopoly hold on power generation while reorganizing grid assets into a much larger northern corporation and a smaller southern grid corporation. The same day that final papers were handed to Xiang, GPPC's director of the General Office, Yuan Maolong, received a call from Beijing reporting that Premier Zhu Rongji had convened the State Council Office Committee<sup>225</sup> to discuss the institutional reform of the electric power industry and put into effect the deverticalization of the SPCC. The clear indication was that personnel and asset structures would be affected by this reorganization.

By June of 2002 Jinyuan had established Zhongshui Energy Development, Ltd.<sup>226</sup> to manage the construction of smaller hydro plants, as well as the Yemazai and Qianxi plants. On December 26, 2002 Jinyuan also registered Guizhou West Energy Power Construction Ltd.<sup>227</sup> This decision was motivated by the belief that the separation of generation and grid assets (*changwang fenkai*) resulting from the de-verticalization of the power industry may force GPPC to divest its generation assets to the newly carved out "Big 5" regional SOEs such as Huaneng Group, and also lose the personnel and expertise in the GPPC related to power production. For example, Huaneng was a commercial SOE with regional reach and close ties to Beijing through the son of former premier Li Peng and would not countenance employees working for local competitors such as Jinyuan.

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<sup>225</sup> "guowuyuan bangonghui"

<sup>226</sup> "zhongshui nengyuan fazhan youxian gongsi"

<sup>227</sup> "guizhou xineng dianli jianshe youxian gongsi"

This loss of knowledge and personnel presented a strategic consideration regarding the future growth of Jinyuan.

Kuang Zhongxiong, vice president of infrastructure construction, argued that one of the competitive capabilities of Jinyuan was the collection of human talent and experience in thermal plant construction embedded in its employees. Kuang argued that GPPC should pre-empt the third round of reform and register a new specialized limited liability firm to maintain the employees – and their portfolio of skills – as well as key firm assets under the roof of one firm. GPPC Office Director Yuan Maolong disagreed, arguing that if the reforms were to create an infrastructure construction company out of the assets of the Provincial Power Company, then having any state-owned assets still in possession of the new company may contradict the legal requirements of the process of “changing systems” (*gaizhi*). Yuan’s recommendation was to have several non-SOE firms invest in the creation of a new independent firm to create such a clean break and allow employees of the Provincial Power Company’s infrastructure construction department to remain together in the new firm.<sup>228</sup>

Xiang approved of this approach and understood Yuan’s fundamental logic. He then arranged for Jinyuan and five other firms, including Zhongshui, Tianneng, West Power, Tianda, and Xingneng, to co-invest RMB50 million towards the creation of Guizhou West Energy Power Construction Ltd.<sup>229</sup> As was the case with Jinyuan at its inception, Xingneng’s seven percent investment, or approximately RMB3.5 million, was contributed directly by Xingneng employees. The new firm was registered through the provincial government on December 26, 2002. By January, 2003 GPPC’s construction

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<sup>228</sup> Interview G-3, G-11, G-1.

<sup>229</sup> “*xineng dianli jianshe youxian gongsi*”

management department was dissolved and 86 workers (plus 20 retirees), their liabilities and responsibilities, were transferred to the newly established West Power Company. West Company became the third subsidiary under Jinyuan.

*Jinyuan's Impact on the Market: Integrating Coal and Power*

Michael Eisner has noted the tendency of firms to internalize functions of the market that are needed and under-supplied in rapidly expanding economies with decentralized or fragmented governance. Eisner writes about the industrial firms in the US Progressive Era, observing that firms: “integrated vertically, incorporating suppliers of raw materials, wholesalers, and retailers and thus internalizing transactions that had formerly taken place in markets...[i]ncreasingly, large corporations used these skills to dominate industries and manage expansion and competition, threatening the highly decentralized, locally based economies that had prevailed in earlier decades”<sup>230</sup> In addition to revealing the ways in which firms use legal and corporate forms to respond to national regulatory shifts, Jinyuan’s evolution also highlights the important trend of vertical integration among these newly emerging firms that continues to drive consolidation of China’s electric power market. As a Jinyuan vice president directly stated, through the vertical integration that Jinyuan achieved during its growth, “the firm was able to internally model many of the critical management mechanisms provided by a (normally functioning) market”.<sup>231</sup>

By 2002, Jinyuan’s growth in electric power capacity, combined with the national economic recovery, resulted in heightened demand for local coal in Guizhou. However,

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<sup>230</sup> Michael Eisner, *Regulatory Politics in Transition*, (Baltimore, MD: Johns Hopkins University Press), 2000, p.29

<sup>231</sup> “*ba qiye neibu moni shichang wei hexin de guanli tixi yunzuo de xiangdang chengshu*”, Xiang, p.529.

due to a highly fragmented market and the historically small scale of coal producers in the province, coal supply investments had not kept pace with power investments, and began to lag in the region, resulting in initial fuel shortages. Many provincial governments began to remedy the imbalance by instituting a “Big Coal Guarantees Big Power” (*damei bao dadian*) policy in an effort to signal to firms that investment was needed upstream in the power industry. By early 2002, Guizhou lacked about 2 percent or 1 million tonnes of coal, and forfeited approximately 2 billion kWh of power that could have been produced. Each kWh earned about RMB5, resulting in over RMB10 billion lost in revenue for generators because of a lack of adequate coal supply.

Eager to resolve the supply chain challenge, Jinyuan established on March 28, 2003 Guizhou Nengfa Power and Fuel Development, Ltd.<sup>232</sup> The new firm had registered capital of RMB80 million, and Jinyuan became the largest shareholder, with a 35% stake. The companies of West Power, Zhongshui, Xingneng and Tianneng held a respective 30%, 20% 10% and 5%.<sup>233</sup> This amount was later supplied with additional rounds of equity. China Development Bank provided the loan of RMB8.6 billion, largely due to Guizhou’s pivotal role in the nationally supported WEPTP. The loan was used to finance the province's major power projects that served this project, including the Dongfeng Hydropower Station, the Hongjiadu Hydropower Station, the Suofengying Hydropower Station, the Nayong Power Plant, the Anshun Power Plant and the Panxian Power Plant. Jinyuan Power received RMB2.2 bln of this loan for its Nayong Power

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<sup>232</sup> Xiang, p.515. “*guizhou nengfa dianli ranliao kaifa youxian gongsi*”

<sup>233</sup> Interfax China Business News, “Nengfa Power Fuel Development Company Founded in Guizhou”, April 2, 2003.

Plant, Qianbei Power Plant, Nayong Second Power Plant, Qianxi Power Plant and Dafang Power Plant.<sup>234</sup>

This integration upstream proved to be particularly useful to Jinyuan, given the highly fragmented structure of the provincial coal market and the small scale of the firms that dominated over three quarters of the provincial market.<sup>235</sup> Nengfa Power and Fuel Development Co. was entrusted with the responsibility to acquire controlling stakes in two companies (Jinhong and Jinyi), as well as the Shenxianpo Coal mine. Meanwhile, the company was also tasked to acquire stakes in the four coal mines of Qinglong, Fa'er, Wulunshan and Linhua, as well as in the Guizhou Provincial Coal Resources Prospecting and Development Company. Here the newly created private firm was using its capital to acquire stakes in state-owned assets, this time in coal resources.

Jinyuan's coal strategy gained clarity and critical momentum through a June 11, 2003 Ministry of Land and Resources (MLR) notice entitled "Management Forms of Rights Relating to Mine Exploration, Use, Bidding and Auctioning".<sup>236</sup> The notice explained how new regulations regarding the exploration, exploitation, bidding for, auctioning of, and overall management of coal would take effect in August, 2003. Executives at Jinyuan understood that coal costs were continuing to rise under combined conditions of greater demand and the closing of many mines under the strengthening environmental regulatory regime. It therefore became clear that the firm must identify as

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<sup>234</sup> Interfax China Business News, "CDB Grants USD 1.04 billion Loan to Fund Guizhou's WEPTP", March 27, 2003.

<sup>235</sup> Guizhou Statistical Yearbook, 2004.

<sup>236</sup> MLR [2003] No. 197 (June 11, 2003). "*tankuangquan caikuangquan zhaobiao paimai guapai guanli banfa*".

many enclosures of coal as possible, obtain provincial SDPC approval on such sources, and lock in the resources before the regulatory changes took effect.<sup>237</sup>

The strategy for a latecomer to the energy market such as Jinyuan was straightforward. Mines with annual production of 1 million tonnes and above had already been partitioned and were owned by either the provincial power firm itself or the major coal producing firms. Mines with annual capacity of 300,000 tonnes and below were fairly low in number, posed the regulatory risk of being eventually shut down, often proved difficult to bring to scale, and were owned by a vast array of entities ranging from farming individuals, TVEs, SOEs, and other hybrid firms. A third category of mines, with annual production of 450-600,000 tonnes, had been left fairly untouched.<sup>238</sup> The largest mine operators were unwilling to work them and the smaller mine operators were unable to do so, lacking the financial resources. The rush to “enclose/partition coal” (*quanmei*) resources was only heightened when other firms began to mimic actions undertaken by Jinyuan in the spring of 2003.

Representatives of Jinyuan traveled to 16 counties in six separate cities/prefectures between May and July, 2003. In one month one particular executive traveled 12,000 km in his Audi, averaging about 400km a day visiting prospective mine acquisitions, and by July had obtained use rights for reserves of over 1 billion tonnes of coal development.<sup>239</sup> By 2004 Nengfa Ltd. had completed applications for 15 mines, with 9 mines under construction and an annual capacity of 37.15 million tonnes under full or partial ownership. Nengfa also held three rounds of shares expansion to raise necessary

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<sup>237</sup> By 2003 the SDPC had been renamed the National Development and Reform Commission, or NDRC. Xiang, p.516.

<sup>238</sup> Interviews G-9, G-2, G-16, B-29. Referenced in Xiang, p.516.

<sup>239</sup> Xiang, p.517.

financing for the construction of such facilities, with total registered capital rising to over RMB510 million by 2005.<sup>240</sup>

*Environmental Regulation as Opportunity: Diversification into FGD Licensing*

Provincial level environmental regulations were also beginning to take shape in June, 2003, particularly in relation to the WEPTP. The Guizhou NDRC issued regulation No. 9, entitled “Opinions Regarding the Next Step in Expediting Guizhou’s WEPTP Engineering Construction Projects”.<sup>241</sup> Specifically, this regulation called for the “serious implementation of environmental controls” in “top of stack” sulfur reduction and the use of low sulfur coal in all first-phase WETPT thermal units located outside the original southern acid rain zone delineated by national environmental regulation in 1996. In addition, second phase thermal projects (the six thermal or “*liu huo*” projects), were mandated to install flue-gas desulfurization (FGD) equipment.”<sup>242</sup> Faced with tightening environmental restrictions, Xiang’s reaction was to supply this new market by creating a firm that focused on the manufacture of environmental equipment. The firm, named Guizhou Xingyun Environmental Engineering Ltd., was established in May, 2004.<sup>243</sup> Xiang organized eight affiliate firms to invest a total of RMB50 million in capital. On March 16, 2005 Jinyuan Group formally invested another RMB30 million to establish a 37.5% controlling share.<sup>244</sup> GPPC’s vice Chief Engineer and Director of Planning became the new company’s president.

Before Guizhou Xingyun had been established, there were a handful of FGD projects in Guizhou. The Anshun plant had installed two units with FGD equipment, the

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<sup>240</sup> Interviews G-9, G-19, G21.

<sup>241</sup> “*guanyu jinyibu jiakuai wosheng xidian dongsong gongcheng jianshe de yijian*”

<sup>242</sup> Interviews G-2, G-17, G-14, G-10; Xiang, p.519.

<sup>243</sup> “*guizhou xingyun huanbao gongcheng youxian gongsi*

<sup>244</sup> Xiang, p.521,522.

Yafu plant had four units installed, and the Guiyang plant had two more units installed for a total of eight in the entire province. However, the first large scale FGD project was an installation for the Pannan plant (4x600MW) in June 2004. This project was co-invested by Yuedean Power in Guangdong (55 percent) and Jinyuan's West Power Company (45 percent). In a second round of major projects the following year, five firms had bid for the work, including firms from Sichuan province. Xingyun won the bid, and the six plant project to install FGD at Nayong plant #2 units 1-4, Qianxi plant units 1-4, Pannan plant units 3-4, Dafang plant units 3-4, and Yemazai plant units 1-3 for a total of RMB1.8 billion.<sup>245</sup> By the end of 2005, there were seven projects under construction, installing a total 4.65GW of capacity with FGD equipment.<sup>246</sup>

Xingyun had, by the end of 2005, invested RMB408 million in FGD projects and realized profits of over RMB25 million. Estimated 2006 investment was RMB609 million. There were two strategies regarding how to enter the FGD business. Many of Jinyuan's executives, through their work at GPPC, were aware that developed economies had begun to regulate sulfur dioxide decades before, and that the technology was therefore quite mature abroad and that costs had lowered significantly. The first option was naturally to buy whole sets of FGD equipment and import them to China. Each set would cost about RMB40 million. Each separate unit would cost approximately RMB2-3 million. To purchase eight projects' worth would cost an estimated RMB100 million.<sup>247</sup> The second, ultimately more viable option, was to tender bids for foreign firms to participate, and pay through a technology licensing agreement.

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<sup>245</sup> Interviews B-23, G-17, G-10, B-18; Xiang, p.525.

<sup>246</sup> Xiang, p.523.

<sup>247</sup> Interviews G-18, G-2, B-39, G-8; Xiang, p.524.

In order to expedite the importation of FGD technology, rather than wait for World Bank or Japanese Official Development Assistance (ODA) financing as in the past, Xingyun decided to tender bids for the FGD work, and nine foreign firms participated. By December, 2005 Jinyuan had selected the German firm “Steinmuller Engineering GmbH” for the project and by the spring of 2006 work had begun and licensing agreements concluded. Lacking extensive knowledge of FGD technology licensing, Xingyun identified a JV firm, Zhejiang Zhaoxing German Energy Environmental Equipment Company,<sup>248</sup> and together they founded Zhejiang German Environmental Innovation and Technology Ltd.<sup>249</sup> Xingyun then bought another provincial state-owned asset, the Guizhou Boiler factory on December 20, 2005 for RMB18.8 million and began plans to enter the Electrostatic Precipitator (ESP) market to round out the firm’s portfolio of coal fired power plant environmental mitigation assets and capabilities.<sup>250</sup>

Jinyuan would go on to emphasize the diversification of its portfolio throughout 2005. The change in name from “Electric Power Corporation” to “Investment Corporation” symbolized this shift in strategy and direction. While the generation of power would remain the core of business activities, investments increasingly diversified assets under management and in the group’s name through subsidiary firms. In sum, Jinyuan vertically integrated upstream into coal production, downstream into chemicals, and the production of specialized power production equipment, the licensing of environmental mitigation equipment, limited forays into medicine and real estate development, and laterally through the opening of an electric power operations and

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<sup>248</sup> “zhejiang zhaoxing deneng huanbao jianbei gongsi”

<sup>249</sup> Interviews G-16, G-1, G-19; Xiang, p.521,526. “Zhejiang dechuang huanbao keji youxian gongsi”

<sup>250</sup> “guizhou guolu chang”

management specialization arm. This last firm did not own outright the generation asset, but was a service firm that operated and maintained the plants of other competitor firms like Huadian. Jinyuan had already met its 2005 goal of exceeding RMB10billion by 2007 and seeks to double this figure by 2010.

The stated rationale motivating the drive to diversify was the perceived need for such a variety of services and activities to support Guizhou's comprehensive development plan. This need was joined by internal firm projections that forecast an electric power glut by mid-2008 that would adversely affect earnings, and a perceived international opportunity to license FGD technology to serve the needs of other plants as Chinese environmental regulations began to be enforced in the near to medium term. Each subsidiary approached the diversification in a different way. West Power became involved in the iron industry, Zhongshui became involved in new building materials and diesel production industries, while Nengfa entered the coal production industry and Xingyun the environmental mitigation equipment licensing business. Xineng diversified further afield into real estate through the Guizhou Yuanlong Real Estate Development Company<sup>251</sup> which was 70 percent owned by Xineng, 20 percent owned by Shenghua Resource Company<sup>252</sup> and 10 percent owned by Xingyun.<sup>253</sup>

### *"Cleaning Up" after Reform*

#### *Asset Consolidation*

Jinyuan combined this diversification strategy with a drive to consolidate the firm's thermal asset portfolio. On April 19, 2005 Jinyuan Group established Guizhou Jinyuan Power Operations Ltd., with registered capital of RMB100 million, later raised to

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<sup>251</sup> *Guizhou Yuanlong Fangdichan Kaifa Youxian Gongsi*

<sup>252</sup> *Shenghua Yuan Gongsi*

<sup>253</sup> Xiang, p.541.

180 million.<sup>254</sup> Jinyuan Group held a 50% controlling share of the firm. All of the thermal power assets of Jinyuan Group (Jinyuan Jituan), West Power (Xi Dian), and Zhongshui were transferred to Guizhou Jinyuan Power Operations (both 100% controlled assets and partially controlled assets), while Jinyuan Group maintained their Production and Operations department.<sup>255</sup> Having consolidated thermal assets that had been under full control of the Jinyuan Group subsidiary firms, Jinyuan then turned to negotiate the acquisition of the many plants in which Jinyuan had partial ownership. The first critical target was the Yafu plant (at the time owned 49 percent by West Power and 51 percent by the “Big 5” SOE Guodian Group). Jinyuan and Guodian Group signed a partnership agreement in September, 2005, entrusting the Yafu assets to the newly established Guizhou Jinyuan Power Operations Ltd. Yafu LLC<sup>256</sup> signed the specific trust agreement with Guizhou Jinyuan Power Operations Ltd., entitled “*Yafu fadianchang weituo yunxing weihu ji shengchan guanli hetong*”.<sup>257</sup> The success of this partnership led to other plant assets being entrusted to Jinyuan by other major power producers, such as the Pannan plant by Yuedean Power Group in 2006 (45 percent ownership by West Power, 55 percent by Yuedean).

In all, by 2006 a total of eight plants were being managed by Jinyuan Group, even though not all were directly majority-owned by Jinyuan. Plants online by 2006 totaled a capacity of 7.74GW, with another 10.14GW under agreement to be managed by Jinyuan.<sup>258</sup> A vice president of Guizhou Jinyuan Power Operations Ltd. explained that the creation of the firm aided greatly in the delineation of profits, debt, and property

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<sup>254</sup> “*guizhou jinyuan fadian yunying youxian gongsi*”

<sup>255</sup> “*jinyuan jituan gongsi shengchan yunyingbu*”

<sup>256</sup> “*yafu fadian youxian zeren gongsi*”

<sup>257</sup> “*yafu fadian weituo yunxing weihu ji shengchan guanli hetong*”

<sup>258</sup> Interfax China Business News; Xiang, p.528.

rights over assets. Liabilities and assets had been confused during the rapid expansion of Jinyuan Group and its subsidiaries along the power value chain. As a result, the power operations firm was able both to clarify rights to such assets, and also to improve the coordination between different segments of the production chain that were now under the ownership of Jinyuan. While before Jinyuan's vertical integration mines and plants were continually operating with asymmetric information and large scale gaming through shortages and delays, Jinyuan was able to mitigate most of this inefficiency through such integration.

By the time the State Council directive relating to the reorganization of the power sector had been issued, the implementation of separating grid assets from generation assets had begun (*fadian zichan chongzu fangan*).<sup>259</sup> Eleven new companies had been created out of the monopoly SPCC. In Guizhou, the reform split the electric power value chain as well. Grid assets were transferred to the Southern Grid Company, while the thermal and hydro assets were transferred to two of the newly independent "Big 5" power generation SOEs - Huadian and Guodian Groups. There was initial confusion, as Jinyuan by this point was technically classified as a state-owned shareholding corporation. However, as Jinyuan successfully argued, the firm had by design been established without state electric power assets before the reform, and was therefore left untouched. It was still clear to many that Jinyuan's position was not altogether without risk of regulatory investigation in the future.

#### *Rationalizing Posts and Switching "Red Hats"*

As a result, on October 20, 2004 the Guizhou Party Secretary met with Xiang Dehong to discuss a proposal. The Secretary argued that it would be prudent for Jinyuan

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<sup>259</sup> "*fadian zichan chongzu fangan*"

to accept a capital infusion of approximately RMB40 million directly from the Guizhou provincial government, for three main reasons.<sup>260</sup> First, the Secretary explained that such an infusion, equaling two percent of total firm capitalization, would transform Jinyuan's legal classification. Without state investment, Jinyuan would remain classified as a "Shareholder Enterprise with Natural Person Investors as the Base".<sup>261</sup> With a modicum of state investment, Jinyuan would transform into a "State Participant Investor (Relative Controlling) Blended Ownership Enterprise with Diversified Investors as the Base".<sup>262</sup> This change in legal status, the secretary argued, would not only provide some political capital, should the central government question the presence of a large private firm operating in a "backbone" industry, but would also legally expedite the planned evolution into a corporate Group (*jituan gongsi*). This reclassification occurred six months later on April 28, 2005, with Jinyuan's name changed to Guizhou Jinyuan Shareholding Group, Ltd.<sup>263</sup>

Second, the Secretary argued that the senior executives of GPPC should not simultaneously hold positions in both Jinyuan and the provincial power company. These individuals were either to remain in the provincial power company or transfer to Jinyuan. This simultaneous posting had already caused an excess of corruption accusations, media attention, and inquiries from the central government.

Third, the Secretary reminded Xiang that it was unclear how long the provincial party secretary would remain in his current position. A limited measure of local state ownership in the firm would more clearly align the interests of the new Secretary with the

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<sup>260</sup> Xiang, p.534.

<sup>261</sup> "ziranren wei chuzi zhuti de gufenzhi qiye"

<sup>262</sup> "guoyou cang (xiangdui konggu) de duoyuan touzi zhuti hunhe suoyouzhi qiye"

<sup>263</sup> "guizhou jinyuan jituan gufen youxian gongsi"

firm in institutional terms, and thus allow Jinyuan the independence to operate in the province.<sup>264</sup>

After the discussion, Xiang agreed to the terms. At the time, Xiang was Party Secretary and President of GPPC, while simultaneously holding the post of Chairman of Jinyuan. Xiang was therefore concurrently the legal representative of both firms. Kuang Zhongxiong was a vice president of the provincial power company while also a vice chairman and the party secretary of Jinyuan. Wang He served as both a vice president of the provincial power company and a vice party secretary of Jinyuan. Sun Zhaoai served as the Party Discipline Committee Secretary and the chairman of the labor union of the provincial power company while also a vice party secretary of Jinyuan. Yuan Maolong served as the provincial power company's assistant inspector and a vice chairman of Jinyuan. Xiang considered options for personnel transfer and decided that he, along with Kuang Zhongxiong and Yuan Maolong, would all move to Jinyuan, thus relinquishing their posts at the provincial power company. Wang He and Sun Zhaoai would remain at the provincial power company. Xiang then submitted his plan to the provincial party secretary.

On November 25, 2004 the provincial government handed down its official reply (*pihui*), approving the transfer and the planned provincial government purchase of a stake in Jinyuan. On November 29 the Jinyuan board of directors convened and voted to take specific steps according to the conversation between the party secretary and Xiang. First, Jinyuan would accept the provincial investment in Jinyuan. Importantly, this would allow the provincial Organization Department to review and inspect (*kaocha*) the new Jinyuan senior executive positions, and would require the Shareholder Board and Board

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<sup>264</sup> Interviews G-17, G-4, G-14, B-29, B-31.

of Directors to submit the list of names to the provincial organization department. Second, Jinyuan would also be required to vote in the newly selected leaders, according to the new name list and the vote of the Shareholder Board and Board of Directors. By December 2, 2004 Xiang had flown to Guangzhou to inform the Southern Grid of these decisions. On December 31, 2004 the Guizhou Party Standing Committee approved the new list of names submitted by the provincial Organization Department. On January 11, 2005 Jinyuan shareholder meetings voted in this new list of Jinyuan senior executives.<sup>265</sup> The Guizhou provincial governor participated in the meeting and triumphantly announced that Jinyuan “responded to the government’s call [to develop resources for the ‘Develop the West’ Campaign]”.<sup>266</sup>

These developments in Guizhou were occurring while related discussions were emerging within the central government. Many of Jinyuan’s finance and ownership status aspects were legitimated by regulatory proclamations from the central government. In February, 2005 the State Council promulgated a new regulation, entitled “Opinions Concerning the Encouragement, Support, and Guiding of Individually Owned and Privately Operated Non-state Economic Development”.<sup>267</sup> By the spring of 2005, even China’s president Hu Jintao visited Guizhou, stating: “Guizhou is facing a precious opportunity to build a ‘Middle Class’ (*xiaokang*) society and to fully realize the ‘Develop the West’ directive – every group must strive to grasp this opportunity and strive to realize this historically significant economic and social development.”<sup>268</sup> On April 20,

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<sup>265</sup> Xiang, p.536.

<sup>266</sup> Xiang, p.548.

<sup>267</sup> NDRC [2005] No.3 (February 19, 2005). Zhang Shaojing, “Jinyuan zhilu”, Zhongguo Dianli Qiye Guanli, May 2005 volume, p.38. “*guanyu guli zhichi he yindao geti saying deng feigongyouzhi jingji fazhan de ruogan yijian*”

<sup>268</sup> Xiang, p.539.

2005 Jinyuan had successfully requested to be reclassified as a Shareholding Ltd firm, and its subsidiaries had been clearly and legally delineated; included were; West Power, Zhongshui, Xineng, Nengfa, Fadian Yunying, and Xingyun.

*Different Firm Decisions, Different Models of State Assertion*

Jinyuan's rapid growth and significant contribution to both the WEPTP and the development of China's southwestern energy base occurred through a careful and deliberate series of decisions by the former executives of the provincial power SOE to strengthen the ownership of a private firm and its operational independence from central government and central SOE involvement. This considerable feat was accomplished through clear delineation of initial private capital sources to establish a private firm, a commitment to building this firm through new physical capital in the form of generating plants that were not transferred from the provincial SOE, the movement of skilled labor from the SOE to the new firm, and the blurring of government and enterprise roles through the early dual role of provincial SOE executives also serving as executives in the private firm. Throughout this process Jinyuan very much engaged central regulators, capitalized upon pending and promulgated central and provincial regulation relating to corporate and energy reform, and profited from guided provincial protectionism. The firm's legal status evolved according to the evolution of corporate regulation in Beijing. The firm's investment and ownership decisions evolved in anticipation of energy industry reforms that were simultaneous with major infrastructure development projects in the form of the eventual "Develop the West" program. This institutional evolution produced a firm governed by a diverse shareholding structure that included nearly 30,000 electric

power employees, the provincial government's SASAC, and the former chairman and senior executives of the provincial power generating SOE.

On December 28, 2008 much of this independence seemed to have been lost in a graduated wave of nationalization by the central government. In February, 2008 the Luneng Group of Shandong province, discussed in the subsequent chapter, had been effectively nationalized. The private firm's assets had been transferred back to the provincial electric power SOE that had once been the parent firm of Luneng. Nearly a year later, Jinyuan appeared to suffer the same fate, in the form of a majority purchase of Luneng shares by a listed "Big 5" SOE – the China Power Investment Corporation (CPI). However, Beijing's approach to the two private firms was in reality quite different, reflecting a nuanced approach by the state that accounted for the critically different models of corporatization and growth that these two firms represented.

First, Jinyuan and its assets were not transferred back to the provincial electric power SOE from which it emerged. While Luneng's assets were dismantled and returned to the ownership and operational control of Shandong Provincial Power Company, in contrast Jinyuan remained a shareholding firm with its assets intact and none of its assets or operations transferred to the Guizhou Provincial Power Company. Employee shares were indeed diluted to approximately 40 percent of the firm, but remained in place. SASAC itself acknowledged the critical importance of Employee Stock Ownership Plans (ESOP) in linking SOE employee performance and incentives, citing the success of Jinyuan in power generation growth and the quality of its assets.<sup>269</sup> This proved to be more than rhetoric, and SASAC matched such words with policy action. By the first half

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<sup>269</sup> Interview B-28, B-27.

of 2006 over 80 percent (152 of SASAC's 187 firms) of China's central state owned SOEs had either began or completed non-tradable share reform similar to the path adopted by Jinyuan, with the ultimate aim to list shares on both mainland stock markets.<sup>270</sup> Within this period, profits for these firms rose by 16 percent and sales revenue 21 percent year-on-year.

Second, the level of ownership concentration within Jinyuan remained lower than that of Luneng. While over 95 percent of Luneng had been sold back to the provincial power company and affiliated entities, and eventually the Huaneng Group itself, only 60 percent of Jinyuan was sold, thus allowing considerable voice and voting rights to remain with the SOE employees who were original owners of the firm. Much of the original cast of stakeholders remained, including the Guizhou provincial government, firm employees, and several competing firms whose plants Jinyuan had been operating under service agreements in trust. Major decisions of asset management and disposal, employee compensation, merger and acquisition execution, will continue to be discussed at shareholder board meetings and these meetings continue to include a diverse set of institutional and corporate interests rather than the interests of one listed "Big 5" SOE.

Third, it is important to note the nature of the process by which a subset of Jinyuan shares were purchased. The firm's senior executives had begun in 2007, immediately following the much-publicized purchase of Luneng by Huaneng Group and the transfer to SPPC, to search for potential partners among larger power producers operating in southern China. On September 27, 2008 Jinyuan shareholders approved a framework agreement that outlined how China Resources Power, a Hong Kong listed

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<sup>270</sup> China Daily, "SOEs to get stock incentive plan", August 16, 2006, p.9.  
[http://www.chinadaily.cn/bizchina/2006-08/16/content\\_665865.htm](http://www.chinadaily.cn/bizchina/2006-08/16/content_665865.htm)

energy firm, would purchase a majority stake in Jinyuan. Jinyuan by this point understood that ESOPs with very low levels of government ownership or other SOE ownership were being reexamined by the central state. As the business magazine *Caijing* has reported, the execution of these negotiations delayed considerably when Jinyuan executives argued that China Resources should finance the construction of a railway link between Guangzhou and Guiyang as part of their purchase agreement. As a result of this discussion, negotiations stalled. CPI executives stated that they had been jockeying for Jinyuan's assets since 2007, competing against other major SOE power producers such as Datang and Huadian.<sup>271</sup> Jinyuan entered into talks with CPI only after the breakdown of the framework agreement with China Resources Power, eventually agreeing to a negotiated purchasing price and level of shares that was then approved by Jinyuan shareholders on December 27, 2008.

The 60 percent purchase of Jinyuan was the result of pressure exerted by the central government, perhaps most importantly through formal channels in the promulgation of a joint temporary "opinion" by SASAC, NDRC, Ministry of Finance (MOF), and State Electricity Reform Commission (SERC) in March of 2008 that outlined official concern specifically regarding electricity assets owned by electricity employees.<sup>272</sup> However, the pressure remained indirect and the purchase of Jinyuan assets preserved the productive assets of the firm, enabled the continued separation of the firm from the provincial SOE also producing power, and maintained the overall corporate governance structure, which continues to include a diverse set of stakeholders. Jinyuan

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<sup>271</sup> *Caijing*, "Buyout Unplugs Another ESOP Power Firm", January 7, 2009.

<sup>272</sup> Joint Opinion No. 37, SASAC, NDRC, MOF, SERC, "*Guanyu guifan dianli xitong zhigong touzi fadian qiye de yijian*", March 19, 2008.

was viewed by the central state as a new type of hybrid firm produced by reform that proved invaluable to economic growth in one of China's poorest provinces, the critical source of electricity for an expanding and energy-starved Guangdong province, and the major actor negotiating and planning long term infrastructure needs and execution of the WEPTP. The assets of the firm had been expanded without direct physical asset stripping from the provincial SOE historically generating the bulk of electric power in the province. The demand for environmental mitigation equipment (primarily FGD) among power producers, mandated by central state regulation, was also being served by the firm. Finally, aspects of the employee shareholding reform model were being adopted by SASAC itself among the over 150 firms under its authority, in an effort to improve performance and incentives among executives.

China's corporate landscape in the traditionally state dominated energy sector has been transformed by over two decades of corporate and industry reform. Power generation assets have been corporatized according to a range of models, and blistering growth in output was accomplished through a piecemeal regulatory approach that allowed significant dispersion of capital investment and ownership to sub-central and non-state entities. As the industry chapter of this study illustrated, the result is a power supply in which the "Big Five" SOE firms produced by the breakup of the state monopoly still produce under 50 percent of national installed capacity. The current economic downturn and short-term relief of pressure on energy demand are providing an opportunity for the central state to attempt consolidation in the industry. However, the central state has recognized the variation in China's energy landscape and has chosen to treat consolidation on a firm-by-firm basis, producing a variety of approaches. As the

subsequent chapter illustrates, Luneng Group corporatized according to a model that stripped physical assets and therefore produced a rather different result once nationalization was attempted.

## CHAPTER FOUR

### Case Two The Luneng Group: A Local Firm's Nationalization

#### *Introduction*

This study's first case analyzed how the Jinyuan Group successfully grew by executing one of China's largest industrial policy drives in the reform era and how it negotiated central-level corporate efforts and central-level government efforts to nationalize its assets, emerging reformed but with much of its assets, personnel and corporate ownership structure intact. The case provided a firm-level of analysis to illustrate how local firms responded over time to waves of consolidation and regulatory change at the national level, and how firm strategies created opportunities for independent growth. Jinyuan's executives were able to establish a SOE employee-owned firm with private capital and local government support that rose to become the largest power provider involved in the West to East Transmission Project and in Guizhou itself, providing over 55 percent of the province's electricity by 2007.

In Case Two of this study, the firm-level of analysis is again employed to illustrate how the same national trends and regulatory changes were negotiated by a similarly large local firm in the electric power generation industry, with results that differed in important respects. The Luneng Group's executives also established a SOE employee-owned firm that included private capital that rose to become the 12<sup>th</sup> largest power firm in China. Like Jinyuan, Luneng and its assets evolved over time, adopting a range of legal and corporate forms depending on the phase of consolidation or decentralization the industry was experiencing as economic growth rates varied. However, while Jinyuan remained a viable corporate entity during the most recent round

of consolidation, Luneng was dismantled and merged with its former provincial SOE. Its operations were placed under the authority of the Shandong Provincial Power Company and its ownership was eventually transferred to the largest of the “Big Five” SOE power generating firms – Huaneng Group. In contrast, Jinyuan remains a hybrid firm owned by a range of entities, including private individuals, a provincial government, and the smallest of the listed “Big Five” SOE power generating firms. Its governance structure, executives, and legal status remained intact. While 80 percent of Luneng’s shares were eventually sold to a SOE owned by the central government, 40 percent of Jinyuan’s shares remained in the hands of its original shareholders. Put simply, Luneng’s physical, financial and human assets, as well as its governance, legal status and operations were transferred to a major SOE owned by the central government while Jinyuan’s corresponding assets and structure remained largely intact. Variation in the evolution of these firms has led the central state to treat the consolidation and “nationalization” process of each type of firm quite differently.

The pairing of these two case studies accomplishes two objectives. First, it provides detailed evidence of the mechanisms and channels through which the national regulatory and institutional reforms discussed in Chapter Two influence local firm decisions – and therefore shape the organization of the electric power generation industry. Second, the cases provide detailed evidence of the variation in local level outcomes that these changes can produce, largely as a result of the firm’s historical decisions relating to the management of physical assets and investment strategies. The variation in outcome highlights, on a firm level, the main theoretical point of the time series national data presented in Chapter Two. The aggressive decentralization of ownership and investment

away from the central government does not preclude subsequent reassertion of the central government as a major actor in the restructuring of the industry, even through those very same levers. Moreover, these periods of reassertion largely tend to occur during economic slowdowns in which energy shortages are alleviated, central bureaucracies are consolidated, and major incumbent SOEs support the consolidation or shuttering of local/private/foreign competitors. However, while some firms are able to prosper and persist through such periods of reassertion, others are unable to negotiate and their assets are consolidated.

This case study will provide both points of comparison and contrast to the Jinyuan case, and will highlight how both firms pursued similar strategies in human and financial asset management to take advantage of regulatory and institutional reforms during periods of high economic growth (particularly when growth is nine percent or more). It will also argue that a critical early difference lay in the way in which physical capital was managed by these two firms, eventually leading to the variation in ownership outcome. In the case of Jinyuan, state-owned generating plants owned by Guizhou Provincial Power Company (a SOE firm) were never transferred to the ownership of Jinyuan (an initially private firm). These assets remained under the ownership of Guizhou Provincial Power Company, allowing the SOE to maintain its power generation levels of output despite the creation of the private firm. In contrast, Luneng began immediately to move state-owned assets in the form of generating plants from the ownership of the Shandong Provincial Power Company (a SOE firm) to the ownership of what eventually was named Luneng Group (a mixed SOE/private shareholding firm). In addition, unlike Jinyuan, once Luneng had grown to considerable size and was yielding major profits, Luneng

executives forced their employees to sell their shares of the firm to two opaque private investors without any transparent market clearing price mechanism or negotiation with shareholders.<sup>273</sup> In contrast, Jinyuan's original employee shareholders remained owners throughout Jinyuan's rise.

### Similar Foundations

Upon initial examination the Luneng Group of 2009, like the Jinyuan Group of 2009, appears to be a traditional SOE in a traditional sector. Like Jinyuan, Luneng is majority owned by a state-owned parent firm and also is the largest electricity producer in its province. While Jinyuan's initial reliance on private capital and majority private ownership at first seem to be an aberration for this "back-bone" industry, the founders of Luneng, a state-owned giant, began under circumstances (and with needs) quite similar to those of Jinyuan. More importantly, critical steps pursued by the founders of Jinyuan were also pursued by the founders of Luneng. Financial capital was raised through the same channels; namely employee contributions that provided seed capital and attracted subsequent state bank loans. Human capital and regulatory resources were utilized in the same manner, through the transfer of key personnel from the provincial state-owned firm to the newly established private firm and the simultaneous holding of executive posts in both the old state-owned and new private firms. In such a manner, the largest energy firm in China's poorest province and the largest energy firm in one of its richest provinces raised early capital through private means and established majority privately-owned firms as vehicles of rapid growth to meet racing energy demands in their own and

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<sup>273</sup> In fact, 3 firms originally refused to sell, and told *Caijing* magazine that they were effectively forced to do so. Two of three firms were electricity construction firms. See *Caijing*, "Shei de Luneng?", January 8, 2007.

their neighboring provinces.<sup>274</sup> Perhaps most importantly, the raising of private capital through employees and the subsequent creation of subsidiary holding firms also served as an attempt to capture ownership of local energy assets, mostly in the form of power generation plants, during periods of high economic growth. Partial ownership through further subsidiary creation was then pursued to insulate such assets from transfer to the central government during periods of economic slowdown.

As discussed in previous chapters, the pluralization of investment channels that began with the regulatory reforms of the mid- to late 1980s resulted in a complex range of ownership structures in China's electric power generation industry. In 1984, the "CPC Central Committee Decision on Reform in the Economic Structure" encouraged the development of various types of cooperative ventures owned by the "whole-people" (*quanmin*) the collective (*jiti*), or the individual (*getihu*).<sup>275</sup> Since then, categories of ownership have diversified along with an evolving economy in gradual phases. First, a system of single ownership transformed into a multi-ownership system with collectively or privately-owned enterprises supplementing the core economy owned by the "whole-people". Second, through the introduction of enterprise shareholding, a variety of ownership elements were allowed to coexist within one enterprise, encompassing central state shares, local state shares, other enterprise shares, and private shares owned by

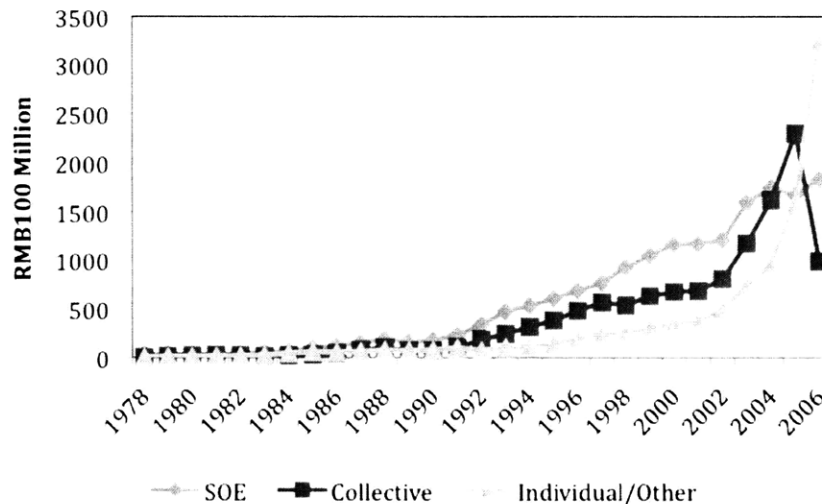
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<sup>274</sup> The decision to pursue private capital and establish private firms, particularly in an industry long dominated by state-owned enterprises and public funds, is noteworthy given the well-documented discrimination private entrepreneurs and private firms have encountered in China. For most recent formulation please see Yasheng Huang, *Capitalism with Chinese Characteristics: Entrepreneurship and the State*, (UK: Cambridge University Press, 2008).

<sup>275</sup> Liu Hongru, "Probe for A Correct Path - Questions on the Experiments in Joint Stock Companies and Stock Market", *Zhongguo Jingji Tizhi Gaige* [China's Economic Structure Reform], June 23, 1992.

individuals.<sup>276</sup> This shareholder form of economic entity is captured by the category “other” in Shandong’s provincial fixed asset investment data, seen in Figure 27.

**Figure 27. Shandong Province Total Investment in Fixed Assets by Ownership**



Source: China Data Online, 2009.

This variety of ownership forms is also evident in the fact that employee-owned firms with Employee Stock Ownership Plans (ESOP) emerged in geographies and areas of economic development as diverse as Guizhou and Shandong. The Jinyuan Group developed in Guizhou, an interior province and China’s poorest. The Luneng Group took root in the nation’s second richest province, Shandong, located on the coast.<sup>277</sup> Other ESOP firms have emerged in Sichuan, Hunan, Ningxia, and several other provinces. The scale of such firms is also evident when one considers that even in wealthy Shandong, Luneng Group has emerged to become the province’s largest firm. Luneng’s total assets grew to be larger than Huaneng Power International, Air China, and Baoshan Iron and

<sup>276</sup> See Shanghai Securities Transaction Regulations (Nov. 27, 1990), in FBIS Daily Report - China, Dec. 20, 1990; see also *Shanghai Shi Gufen You Xian Gongsi Zanxing Guiding* (May 18, 1992), in *Zhongguo Gushi Zonglan*.

<sup>277</sup> National Bureau of Statistics, Shandong Statistical Yearbook, 2008.

Steel in the mid 2000s. With a diversified portfolio that ranges from electric power generation to real estate, not unlike the portfolio that Jinyuan eventually built, Luneng Group's total assets equaled RMB 73.81 billion in 2005.<sup>278</sup> Luneng's total revenue equaled RMB26 billion by the end of 2006 and by the end of 2007 its electric power subsidiary (Shandong Luneng Development Corporation) was ranked the 12<sup>th</sup> largest power generating firm in China.<sup>279</sup>

*Shortage of Central Government Financing for Electric Power, Corporatization of Local State Assets*

The path to successful growth pursued by the founders of Luneng Group traces a historical arc that is similar to that of the founders of Guizhou Jinyuan Power, Ltd. In 1988, two years after the national regulation that sought to attract private and local government investment into the electricity sector, the Shandong Provincial Power Industrial Bureau established a 100 percent state-owned subsidiary firm named Luneng Power Development Company ("LPDC").<sup>280</sup> Initially financed by state sources, the early scale of the LPDC's activities was quite limited. The first general manager of the firm recalled in a recent interview that LPDC began with five people and one office.<sup>281</sup> The firm was one of many secondary and tertiary industry firms established by provincial and municipal level governments in China to diversify local government revenue and to provide local employment. By the early 1990s state asset corporatization reforms had evolved from reforming local government subsidiary assets to reforming the assets of the

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<sup>278</sup> Forbes, "The Forbes 2000", March 30, 2006.

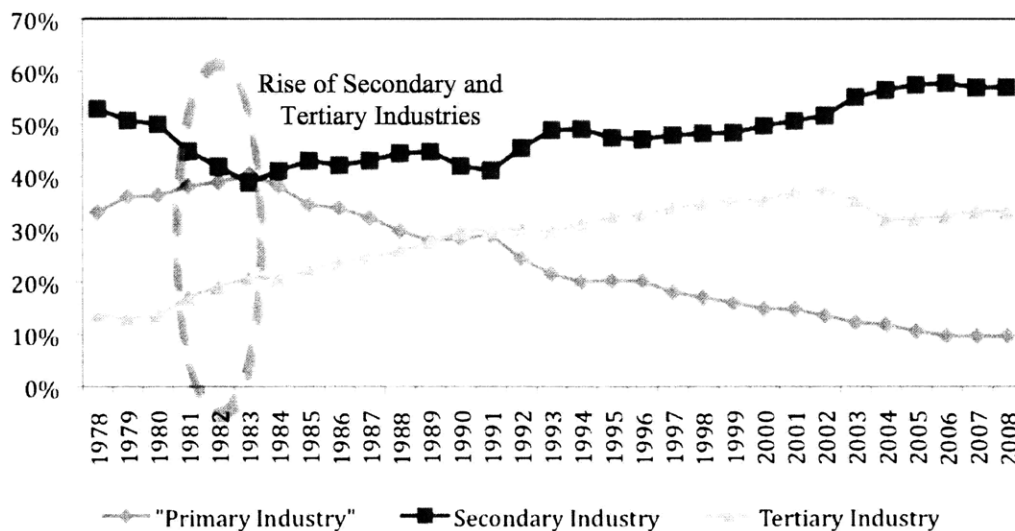
<sup>279</sup> Caijing, "Shei de Luneng?", January 8, 2007; *Power Industry Statistical Compilation*, China Electricity Council Statistical Department and State Grid Company Planning Investment and Finance Department, 2003, p. 58.

<sup>280</sup> For reform legislation see State Council Notice document no. 86, April 17, 1986: "Provisional Regulation on the Encouragement of Fundraising for Power Construction Investment and Implementation of the Multi-Rate Power Tariff". The firm name was "luneng dianli kaifa gongsi".

<sup>281</sup> Caijing, "Shei de Luneng?", January 8, 2007.

provincial government itself. By 1993 the Shandong Provincial Power Bureau had established its corporate counterpart, the Shandong Provincial Power Company (“SPPC”), had transferred grid and power generating assets to the new firm, and had become majority shareholder and regulator of the firm. Such a decision set the foundation for the provincial power company to pursue a path that allowed for a broader range of economic activity through diversification into “adjacent” industries not directly related to electric power.

**Figure 28. Shandong Provincial GDP by Industrial Type**



Source: China Data Online, 2008.

As Figure 28 illustrates, provincial governments and related SOE firms capitalized upon national regulatory changes in order to diversify sources of finance beyond the central state’s declining fiscal transfers and to establish subsidiaries both in energy and in industries other than electric power and coal. As discussed in Chapter Two, real GDP growth rates over 9-10 percent in 1982-84 resulted in electricity shortages of 8-9 percent of national installed capacity. Concern over lack of sufficient investment capital

in this critical industry was apparent in the projections of the State Planning Commission that year. The SPC report outlined that estimated investment needs for electric power during the Seventh Five-Year Plan (1986-1990) equaled RMB 53.6 billion while capital arranged by the central state equaled only RMB 43.0 billion, yielding a gap of RMB 10.6 billion.<sup>282</sup> One of the key central reform measures was a ¥0.02/kWh consumer surcharge. The monies were “dedicated to an Electric Power Construction Fund, which was needed to make up the inadequacy of central funding for this capital-intensive industry”.<sup>283</sup> In addition, the 1984 regulation that supported industry ownership diversification was strengthened by a 1986 measure allowing investment into tertiary industries not directly related to a firm’s “core business”, as well as investment by sub-central public and private actors to enter power generation in particular. As the provincial data reflect, the reforms opened channels for subsidiary firms to pursue consumer light manufacturing and emerging service industries under parent firms of traditionally state dominated infrastructure firms.

*Early Attempts to Establish a Private Local Firm Falter with Lower Economic Growth*

The diversification trends evident in the provincial macroeconomic data are also evident in the decisions of the provincial government and its energy firms. The same year the 1986 regulation had been promulgated, the Shandong provincial government, like the Guizhou provincial government discussed in Chapter Three, introduced measures to affiliate the provincial electric power labor union to a national union and to subsequently grant the union “legal person” status so that investments could be made on behalf of electricity SOE employees. The Shandong Electric Industry Labor Union itself

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<sup>282</sup> Zhou 2007, p.111.

<sup>283</sup> Xu 2002, p. 136.

had been established in 1976 and on July 7, 1986 the provincial congress passed resolution number 69, entitled “Official Reply Regarding Changing the Name of the Provincial Electricity Labor Union and the Transformation of the Electricity and Postal Unions’ Organization”.<sup>284</sup> This resolution allowed the electricity industry union leadership group to change its name from the provincial level “Shandong Labor Union Electricity Industry Work Committee” (*Shandongsheng zonggonghui dianye gongzuo weiyuanhui*)<sup>285</sup> to the national level “China Water Works and Electricity Industry Labor Union Shandong Electricity Committee” (*Zhongguo shuili dianli gonghui shandongsheng dianli weiyuanhui*).<sup>286</sup>

The change in status from a provincial entity to a national entity placed the labor union under the dual administration of the provincial level Shandong Federation of Labor Unions as well as the national level China Water and Electricity Labor Union, the latter of which could approve applications for legal person status and subsequent investment by employees into a new electric power firm. Such status would also later lend the union a “public” and central state-affiliated legitimacy that would prove critical in the creation of Luneng Group. Such maneuvering at the provincial level was seemingly strengthened by the results of the critical July 1987 State Council “National Electric Power Institutional Reform Conference”. The consensus of the discussions was issued in a “20 Word” policy released after the meeting, which served as a guiding statement of electric power reform goals: “Separating Government and Enterprise, Province [Level Power Firms]

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<sup>284</sup> “*Guanyu genggai sheng dianye gonghui ming cheng he gaibian sheng dianye gonghui, shengyoudian gonghui zuzhi de pifu*”.

<sup>285</sup> “*shandongsheng zonggonghui dianye gongzuo weiyuanhui*”

<sup>286</sup> “*zhongguo shuili dianli gonghui shandongsheng dianli weiyuanhui*”

Serving as the Main [Independent] Entities, Raising [Diversified] Capital to Build Plants, Linking the Grids, Integrating Dispatch”.<sup>287</sup>

Plans to inject employee capital into a new firm were halted with the economic slowdown and low growth rates beginning in late 1987 and lasting through early 1990.<sup>288</sup> Real economic growth rates declined from over 11 percent in 1987 to four percent in 1988 and under four percent in 1989. At the national level, while the rights of managers to administer state owned property were seemingly expanded in this period, the laws were still embryonic and provisional in nature and “explicit provisions subordinating the private economy to the socialist publicly owned economy underscored that private enterprises were still viewed as policy concessions to the needs of economic growth and subject to the will and the dispensation of the state.”<sup>289</sup> The role of privately-held capital was therefore uncertain in regulatory terms during this early period of reform, particularly in “backbone” sectors of the economy such as electric power. This regulatory uncertainty combined with the establishment of the Ministry of Energy in mid-1988 to create considerable pressures to consolidate ownership in key sectors and limit local firm growth in the power sector during the economic slowdown.<sup>290</sup> Initial attempts in this direction were pursued by the central state through the enforcement of safety and

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<sup>287</sup> Nanfang Chuang, “Dianli gongye gaige sanshi nian” October 10, 2008. The twenty character policy was “zhengqi fenkai, sheng wei shiti, chouzi bandian, lianhe dianwang, tongyi diaodu”. <http://www.nfcmag.com/articles/1099>

<sup>288</sup> Interviews SD-19, SD-4, SD-11.

<sup>289</sup> Pitman Potter, “Globalization and economic regulation in China: selective adaptation of globalized norms and practices,” *Washington University Global Studies Law Review* 2, no. 1 (2003), p. 129. Provisions expanded through the “Law on Industrial Enterprises Owned by the Whole People”, April 13, 1988. Commonly referred to as the “State-Owned Enterprise Law”, the legislation was notable for the fact that it granted SOEs independent legal status and managerial rights, and held SOEs accountable for profits and losses through independent accounting. See also Yasheng Huang, “One country, two systems: Foreign-invested enterprises and domestic firms in China,” *China Economic Review* 14, no. 4 (2003): 404-416.

<sup>290</sup> See Ministry of Energy, “China’s Energy Industry Development Plan 1989-2000”, June 1989. Zhou, p.117.

standardization of equipment regulations that had just been promulgated at that time.<sup>291</sup> Lastly, the low growth years of the late 1980s greatly reduced central government estimates of electric power needs for the Eight Five-Year Plan (1991-95), and thus reduced pressure for the state to support the growth of local power firms. For example, figures prepared for the November 1989 fifth plenum of the 13<sup>th</sup> Communist Party of China (CPC) Central Committee projected a 5-6 percent average annual growth rate during 1991-1995. In reality, real annual growth rates averaged 12.4 percent.<sup>292</sup>

Despite clear regulatory and legal maneuvering at the provincial level to create a new local firm owned by SOE employees and subsidiary firms, the availability of adequate capital to secure bank loans, and average annual growth rates of 10 percent in electric power generation, such plans were deferred during the period of low economic growth. Instead, Luneng Power Development Company (LPDC) continued to remain under the authority of its provincial SOE parent firm through the late 1980s and into the early 1990s.<sup>293</sup> LPDC financed plants through state policy loans from the China Development Bank (beginning in 1994) and commercial bank loans to build power generation plants and to expand into tertiary industries such as real estate and water treatment. In 1992 over 82 percent of electric power funds deployed by SPPC were sourced from the major commercial banks.<sup>294</sup>

#### *The Return of High Economic Growth and the Proliferation of Local Subsidiaries*

As economic growth rebounded (surpassing 10 percent by 1992), China's macroeconomic conditions shifted, leading to a focus on mitigating inflation and a

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<sup>291</sup> See Zhang Guobao (ed.) *Energy Law and Policy Document Compilation*, (Beijing: China Economic Publishing House, 2006), p. 94.

<sup>292</sup> Zhou, p.117.

<sup>293</sup> Interviews SD-3, SD-8.

<sup>294</sup> Interview B-19, SD-13.

resulting tightening of national credit markets. Sustained annual economic growth between 1992 and 1997 averaged 11.9 percent, placing major pressure on infrastructure and national energy supplies. By 1993 the Ministry of Energy had been dismantled, fractured by internal conflicts between stakeholders and a lack of authority in policy levers such as tariff setting and investment approval that were critical to increase energy supply. Policy pressure once again grew to diversify financial investment and ownership in the electric power generation industry.<sup>295</sup> By the Third Plenum of the 14<sup>th</sup> Party Congress in November 1993 the State Council formally supported “separating government and enterprise” (“*zhengqi fenkai*”) in the electric power industry through its promulgation of the “CCP Decision Regarding Problems of Establishing Market Socialism Economic Management Mechanisms”.<sup>296</sup>

It was during this period of rapid economic development in the early 1990s that subsidiary corporations under Shandong Provincial Power Company were created, including: Shandong Nuclear Group;<sup>297</sup> Shandong Luneng Holding Company<sup>298</sup> and Luneng Material Group. As other scholars have well-documented, this diversification allowed provincial SOEs: i) to improve their cash flow by engaging in a combination of short- and long-cycle business activities; and ii) to increase retained earnings to be utilized as equity investment for new plant capacity.<sup>299</sup> In addition, diversification

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<sup>295</sup> See for example Department of Electric Power document no. 350, September 14, 1993 “Opinion Regarding the Guiding of Preparation to Strengthen Foreign Investment in Building Power Projects”.

<sup>296</sup> “Zhonggong zhongyang guanyu jianshe shehuizhuyi shichang jingji guanli tizhi ruogan wenti de jueding”.

<sup>297</sup> “*hedian jituan gongsi*”

<sup>298</sup> “*shandong luneng konggu gongsi*”

<sup>299</sup> See for example: Mingfang Li and Yim-Yu Wong, “Diversification and Economic Performance: An Empirical Assessment of Chinese Firms,” *Asia Pacific Journal of Management* 20, no. 2 (June 1, 2003): 243-265; Harry G Broadman, “The business(es) of the Chinese state.” World Bank Draft Paper. David Li and Changqi Wu, “Reforming state-owned enterprises: Diversifying ownership versus improving management”, *The Management of Enterprises in the People's Republic of China* (2002) in Anne Tsui and

enabled the reform of state asset productivity through the *addition* of firms rather than the more difficult political task of shutting down and reforming existing firms. The importance of increasing levels of retained earnings for SPPC has only grown over time. Cumulative SPPC data relating to financial sources of investment for electric power between 1993 and 2002 reveal the importance of these diversified sources of funding. “Enterprise funds” raised by SPPC, when added to the smaller non-central financing categories of “local transfers” and “other” (locally collected fees, etc.), amounted to a figure equaling over five times that of central government transfers to SPPC and a third of total commercial bank lending to SPPC over the same period.<sup>300</sup>

#### *Centralization Pressures Emerge with Lowering Growth Rates*

The economic growth rates of 13-14 percent in the early 1990s had been cut in half by mid-1996 and into 1997. Quarterly export growth rates, year-on-year, quickly declined from above eight percent in the first quarter of 1997 to near zero percent in the first quarter of 1999. Corresponding figures for electric power generation match this movement, declining from five percent in the first quarter of 1997 to near zero percent by the second quarter of 1998.<sup>301</sup> By March 1998 the MOEP had been disbanded, its regulatory authority largely transferred to the State Economic and Trade Commission (SETC) and the commercial management of its electric power generation and grid assets (46 percent and 89 percent of national capacity, respectively) transferred to the State Power Corporation of China (SPCC), created a year earlier.

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Chung-ming Lau (eds.), *The management of enterprises in the People's Republic of China*, Kluwer Publishing, 2002.; and Lixin Xu, Tian Zhu, and Yi-min Lin, “Politician control, agency problems and ownership reform: Evidence from China,” *Economics of Transition* 13, no. 1 (2005): 1–24.

<sup>300</sup> *Power Industry Statistical Compilation*, China Electricity Council Statistical Department and State Grid Company Planning Investment and Finance Department, 2003, p. 401.

<sup>301</sup> NBS, *China Economic Yearbook*, multiple years; Woo, p.6.

The creation of the SPCC represented on the one hand a recognition that corporatization had proven successful at the sub-central level of government as a means of mobilizing disparate sources of capital in China and investing such capital in productive energy activities. Central government policymakers within the MOEP and State Planning Commission argued that the creation of large enterprise groups would “create horizontal channels of communication and should be able to exploit economies of scale, enjoy cross-fertilization of management and production techniques, and work cooperatively to improve industrial development and performance.”<sup>302</sup> On the other hand, the creation of the central state-owned SPCC also served as an opportunity, during a period of lower economic growth, to consolidate an industry that had grown in the 1990s through the proliferation of provincial and local firms operating both grid and generation assets. As one long observer of the industry noted: “While corporatization was proceeding, the MOEP wanted to entrench the government’s control of the power sector in its production, transmission, distribution and dispatching. Forming large enterprise groupings was the chosen mechanism to achieve this goal”.<sup>303</sup> This consolidation effort naturally created considerable direct local resistance by provincial and local governments whose assets were being reallocated to ownership under the SPCC.<sup>304</sup> As stated in Chapter Two, it is noteworthy that the centralizing SPCC was created during the height of foreign investment into the electric power generation industry, seemingly as a potential future alternative vehicle for consolidation of state ownership.

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<sup>302</sup> Daniel Chow, “An Analysis of the Political Economy of China’s Enterprise Conglomerates: A Study of the Reform of the Electric Power Industry in China,” *Law and Policy in International Business* 28, no. 2 (1997), p. 405.

<sup>303</sup> Yi-Chong Xu, “A powerhouse reform: conversion from the Ministry of Electric Power to the State Power Corporation of China,” *Australian Journal of Political Science* 36, no. 1: 123, p.139. See also Chow, p. 412.

<sup>304</sup> *South China Morning Post*, “Resistance Stalls Power Overhaul”, June 13, 1996.

The creation of large enterprises in the industry was not a novel concept. The establishment of a national state power corporation had been discussed at the central state level in the early 1990s as an eventual, mature stage of corporatization reforms and was raised again during the drafting of the Electric Power Law in the period leading to its promulgation in 1995.<sup>305</sup> A January 25, 1995 report from the MOEP to the State Planning Commission specifically highlighted the possibility of a “newly created national power grid company”.<sup>306</sup> Such reports were transmitted from the MOEP to all provincial power bureaus, thus indicating the possibility of future asset transfers of grid and power generation from the provincial to the central level. It was at this time, on April 18, 1995, that Shandong Provincial Power Bureau officials established the Shandong Luneng Development Group, Ltd. (SLDC) with registered capital of RMB 1.01 billion.<sup>307</sup> This firm served as the foundation for what eventually came to be named Luneng Group.

SLDC was created as a limited liability company (*youxian zeren gongsi*) that was expressly not a wholly-owned and wholly-financed subsidiary of the Shandong Provincial Power Bureau or the Shandong Provincial Power Corporation. Instead, the firm was majority owned by the same provincial electric power labor union that had pursued the legal maneuvering ten years earlier to serve as an employee investment vehicle. The union, a state-affiliated “public entity”, channeled the private monies of its individual members and invested an absolute majority of 52.3 percent, while the recently established subsidiary firms of the Shandong Provincial Power Company divided the

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<sup>305</sup> Interview B-17; See also MOEP Report no. 45 “*Dianli gonggyebu guihua jihuasi guanyu xiafa dianli xuqiu yuce gongzuo tiaolie de tongzhi*”, January 25, 1995. Xiaoqian Zhou (ed.) *China's Electric Power Program*, (Beijing: Water Power Publishing, 2007), p.740.

<sup>306</sup> MOEP Report no. 45 “*Dianli gonggyebu guihua jihuasi guanyu xiafa dianli xuqiu yuce gongzuo tiaolie de tongzhi*”, January 25, 1995.

<sup>307</sup> 21 Shiji Jingji Baodao, “*Luneng antui minyinghua: 31yi yuangong jizi kongzhi 360yi guoyou zichan?*”, February 28, 2003. See also Luneng Taishan Cable Corporation, “*Luneng taishan: guanyu konggu gudong de guquan zhuanrang tishixing gonggao*”, Document no. 2008-049, December 12, 2008.

remaining shares. Luneng Holding Company invested 19.3 percent, Luneng Wuye Company invested 9.4 percent, Shandong Luneng Fuels Company invested 6.3 percent, Luneng Materials Company invested 3.9 percent, and 18 other firms invested a cumulative 8.8 percent.<sup>308</sup>

**Figure 29. Shandong Luneng Development Company, Ltd.  
1995 Shareholder Structure**

	<b>Firm Name</b>	<b>Share</b>
1.	Shandong Electricity Committee of the China Water and Electricity Industry Labor Union	52.3%
2.	Luneng Holding (Provincial SOE)	19.3%
3.	Luneng Wuye (Provincial SOE)	9.4%
4.	Shandong Luneng Fuels (Provincial SOE)	6.3%
5.	Luneng Materials (Provincial SOE)	3.9%
6+	18 other firms (Combination of SOE and other)	8.8%

*Source:* 21 Shiji Jingji Baodao, "Luneng antui minyinghua: 31yi yuangong jizi kongzhi 360yi guoyou zichan?", February 28, 2003.

The creation of Shandong Luneng Development Company served as an attempt to inoculate rapidly growing assets in provincial subsidiaries from potential transfer to the central government. While the legal and regulatory steps to establish the firm were taken by the provincial government as early as 1986, Luneng was not created until 1995. The decision was stalled from the bottom-up by the provincial government in the face of a plummeting growth rate that had declined by two-thirds by late 1987. As a provincial vice-mayor involved explained, the combination of the economic slowdown and still-embryonic corporate legal reforms created considerable uncertainty over private ownership rights in electric power.<sup>309</sup> Potential deepening of central government authority in the form of the Ministry of Energy (MOE) exacerbated such concerns. These

<sup>308</sup> 21 Shiji Jingji Baodao, "Luneng antui minyinghua: 31yi yuangong jizi kongzhi 360yi guoyou zichan?", February 28, 2003; Interviews SD-8, SD-9, SD-10, SD-11.

<sup>309</sup> Interview SD-18.

fears proved to be well-founded, as the newly-created MOE in 1988 did seek to strengthen oversight through improved safety regulations and other measures. To insulate such assets and remove them from the bargaining table with the central government, provincial government officials, often serving as simultaneous directors both in the provincial power bureau and the provincial power corporation, sought to take advantage of the already successful corporatization trends apparent in the industry and the support of such reform by the central government.

*Luneng's Creation as Pre-Emptive Measure*

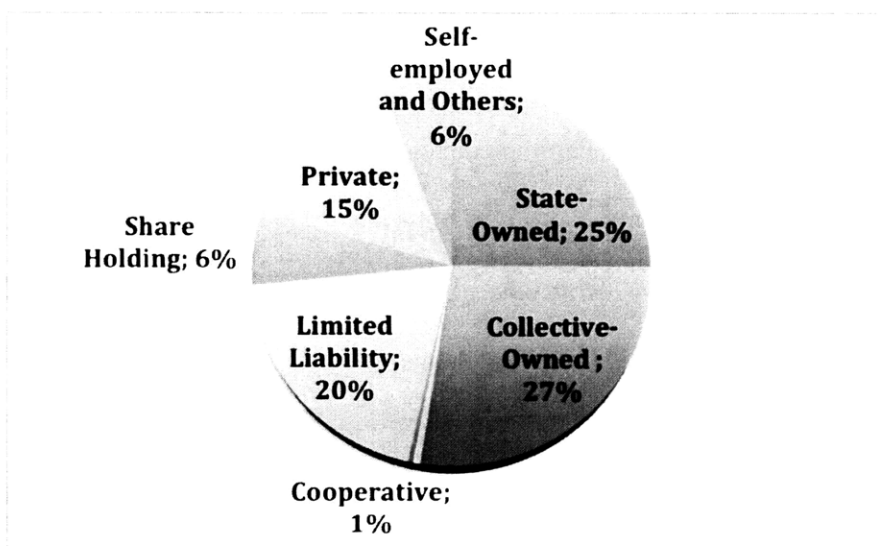
The disbanding of the MOE in 1993, the return of rapid economic growth of 13-14 percent, and the strengthening of China's corporate legal regime through the promulgation of the Company Law that same year combined to provide renewed momentum for the firm's creation. A limited liability company (LLC) form was chosen because capital transfer regulations for such firms are stricter than those for joint stock firms. In particular, Article 35(2) of the Company Law states that if a shareholder seeks to transfer his or her capital contribution to persons who are not shareholders, then the consent of more than half of all shareholders is necessary.<sup>310</sup> The provision is remarkably specific, requiring the consent of more than half of all shareholders rather than of shareholders with more than half of all votes. This renders transfer of capital from an LLC to potential outside shareholders rather difficult, particularly if nearly all shareholders are affiliated with one firm and therefore will vote along similar lines of interest. As a result of this ability to maintain ownership stability, many other firms in China have chosen such a corporate form. By 2006, 23.9 percent of total fixed asset

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<sup>310</sup> Interview SD-3, SD-18, SD-23; Minkang Gu, *Understanding Chinese company law* (Hong Kong: Hong Kong University Press, 2006), p.60.

investment in China was conducted by limited liability firms, third largest after collective-owned and state-owned firms.<sup>311</sup> As expected, the stability of Luneng's ownership structure was strengthened through the additional purchase of remaining shares by subsidiary firms of the provincial power company, with which the labor union was also affiliated through its employees. The firm then quickly began purchasing assets (largely power generation assets) from the provincial power company, and by 1998 had nearly tripled its assets to RMB 2.6 billion, owning over 30 generating units equaling over 4 GW (approximately 25 percent of provincial generation capacity).<sup>312</sup>

**Figure 30. Total Fixed Asset Investment by Ownership of Enterprise, 2006**



Source: LBNL, China Energy Databook, 2008.

The protection of Shandong's provincial power assets through the establishment of SLDC was subsequently tested with the creation of the national State Power Corporation of China (SPCC) in 1997 and the centralization of assets initiated during the

<sup>311</sup> LBNL China Energy Databook, 2008.

<sup>312</sup> Caijing, "Shei de Luneng?", January 8, 2007.

period of lower economic growth between 1997 and 1998. The seven percent economic growth China experienced in late 1997 and into 1998, largely as a result of the East Asian Financial Crisis, proved to be the second lowest growth rate of the 1981-2007 period.<sup>313</sup> The creation of the SPCC set the stage for the transfer of the majority of provincial grid and generation assets away from the MOEP and also from several provincial governments, including Shandong. The economic slowdown provided opportunity for the transfer to be initiated, and by December 1998 the Shandong Provincial Power Company had, at least in accounting and legal terms, become a direct subsidiary of the central-level State Power Corporation of China.

In theory, all assets that were *wholly owned* by Shandong's provincial power firm and its general management were placed under the auspices and ownership of the new national firm. Delays in local implementation resulted in operational control remaining with the provincial firm's executives until late 2000 – less than two years before the national firm itself was dissolved. Transmission grid assets were transferred to the national firm, along with power generation assets. This transfer of ownership and authority sought to achieve the critical reform goal of “separating government from enterprise”, and removing regulatory authority from those managing commercial assets. In the period preceding 1998, the Shandong Power Industrial Bureau served as the major shareholder of its corporate counterpart, the Shandong Electric Power Corporation. The same group of executives therefore controlled regulatory function and commercial management, while provincial regulators often owned many of the assets they were regulating. Upon legal transfer to the national firm in 1998, ownership and commercial

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<sup>313</sup> The lowest growth period was 1988-1989, during which time the Ministry of Energy was established. Many Chinese economists consider the 1998 GDP growth rate of 7.8 percent to be an overestimate by several percentage points – see Dittmer and Wu, pp.61.

management passed (in theory) from the provincial government to the central government, while regulatory powers were placed with the State Economic and Trade Commission. Following the 1998 reform the ownership of these assets has since remained in central government hands (with several iterations of central state actors serving as owner, discussed below).

Delay in implementing commercial management reform allowed further purchases of state assets by the Shandong provincial power authorities. The creation in 1995 of the SLDC allowed consolidation of electric power assets in the hands of a firm owned by local actors, but other subsidiaries had invested in a diverse range of industries and a larger holding company was needed to serve as an umbrella for such firms under local management.<sup>314</sup> As a result, following the establishment of the national State Power Corporation in early 1997, but prior to the transfer of the Shandong Provincial Power Company's ownership from the provincial government to the new national firm, the provincial government leaders of Shandong's power bureau also established the Luneng Group Corporation (LGC) in early 1998 as a non-state holding company (*feiguoyou kongguxing gongsi*), administratively independent of both the provincial power bureau and the provincial power corporation.<sup>315</sup>

As was the case with SLDC, Luneng Group was established with equity investment from SOE employees – again the labor union's Shandong Provincial Electricity Committee.<sup>316</sup> The union was the largest shareholder of the firm, holding 31.52 percent of initial shares, counting 31,702 members and contributing a total of RMB 1,006,704,400. Lowest-level employees were asked to contribute 30,000 each, office

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<sup>314</sup> Interviews SD-25, B-19, B-39. See also Caijing, "Shei de Luneng?", January 8, 2007.

<sup>315</sup> "*feiguoyuo kongguxing gongsi*"

<sup>316</sup> "*Zhongguo shuili shuidian gonghui shandong dianli weiyuanhui*"

(*chu*) level employees were asked to contribute RMB 50,000, and bureau (*ju*) level employees were asked to contribute RMB 80,000. Much like Jinyuan's structure in Guizhou, the other 49 shareholders all held much smaller relative shares, ranging from 0.5 to less than 4 percent.<sup>317</sup> In the case of Jinyuan, the provincial power company executives who founded the firm had opted to create an entity independent from the provincial power firm in an effort to create clearer profit incentives for managers, to build more rapid power generation assets, and to increase their own wealth through equity shares in the new firm. The founders of Luneng created an independent holding company for much of the same reasons, but rather than begin with new financial capital from employees and new physical capital through the building of new (greenfield) electric power plants, the holding company served as a vehicle to combine new projects with the transfer of existing plant assets from the SPPC and the LPDC to the Luneng Group.

**Figure 31. Luneng Group Shareholder Structure, 1998<sup>318</sup>**

<i>Name of Shareholder</i>	<i>Amount Invested (RMB)</i>	<i>Ownership (%)</i>
1 <i>Zhongguo shuili dianli gonghui Shandong dianli weiyuanhui</i>	100,670.44	31.52
2 <i>Shandong fenghui touzi youxian gongsi</i>	12,439.00	3.89
3 <i>Jinan shineng touzi youxian gongsi</i>	11,530.00	3.61
4 <i>Shandong luyuan dianli ziyuan kaifa jituan youxian gongsi</i>	9,590.00	3.00
5 <i>Feicheng fuyuan ganshi fadian youxian gongsi</i>	8,434.00	2.64
6 <i>Shandong luneng wuye gongsi</i>	7,715.56	2.42
7 <i>Zibo zhongxin dianli youxian gongsi</i>	7,621.00	2.39

<sup>317</sup> "Tianjin nankai gede gufen youxian gongsi zhongda zichan goumai baogaoshu", August 8, 2004, p.5. [http://download.hexun.com/ftp/pdf\\_stockdata\\_2009/00/54/36/543619.pdf](http://download.hexun.com/ftp/pdf_stockdata_2009/00/54/36/543619.pdf).

<sup>318</sup> Zhengquan Shibao, "Guangning fazhan gongbao zhengwen di 000537 hao: 'Xiangcai zhengquan youxianzeren gongsi guanyu tianjin kai gede gufen youxianzeren gongsi zhongda zichan goumai youguan qingkuang zhi hecha baodao'", November 26, 2004. <http://app.finance.ifeng.com/data/stock/ggzv.php?id=13004374&symbol=000537>

8	<i>Shandongsheng dianli gongyeju jiguan gonghui weiyuanhui</i>	7,025.00	2.20
9	<i>Shandong huangqin reli youxian gongsi</i>	6,950.00	2.18
10	<i>Qingdao xinhong fadian youxian gongsi</i>	6,511.00	2.04
11	<i>Qingdao yijie hongtai touzi youxian gongsi</i>	6,200.00	1.94
12	<i>Qingdao shitai jingmao fazhan youxian gongsi</i>	6,169.00	1.93
13	<i>Beijing xinhuida touzi youxian gongsi</i>	6,137.00	1.92
14	<i>Weifang minghua dianli shebei youxian gongsi</i>	6,028.00	1.89
15	<i>Zaozhuang xinlantian fenmeihui kaifa youxian gongsi</i>	6,004.00	1.88
16	<i>Yantai hongyuan dianli shiye youxian zeren gongsi</i>	5,801.00	1.82
17	<i>Shandong liancheng nengyuan fazhan youxian gongsi</i>	5,448.00	1.71
18.	<i>Qingdao hengyuan touzi youxian gongsi</i>	5,328.00	1.67
19.	<i>Zibo hongli reneng you xian zeren gongsi</i>	5,324.00	1.67
20	<i>Yantai dongyuan dianli jituan youxian gongsi</i>	5,048.00	1.58
21	<i>Zaozhuang luneng liyuan dianli jituan youxian gongsi</i>	5,006.00	1.57
22	<i>Heji baihui zhuzao youxian gongsi</i>	4,822.00	1.51
23	<i>Shandong runtong guandao gongcheng youxian gongsi</i>	4,700.00	1.47
24	<i>Weifang yuanzhou touzi youxian gongsi</i>	4,451.00	1.39
25	<i>Jining tiande keji youxian gongsi</i>	4,136.00	1.29
26	<i>Linyi taoyuan jituan youxian zeren gongsi</i>	3,990.00	1.25
27	<i>Laiwu zhuoyue dianli fazhan youxian gongsi</i>	3,822.00	1.20
28	<i>Taian lubang dianli shiye jituan youxian gongsi</i>	3,804.00	1.19
29	<i>Dezhou yingweite dianqi youxian gongsi</i>	3,466.00	1.08
30	<i>Linyi changneng huanbao youxian gongsi</i>	3,327.00	1.04
31	<i>Shandong fangxing dianli shiye youxian gongsi</i>	3,113.00	0.97
32	<i>Liaocheng luneng huachang shiye youxian gongsi</i>	2,942.00	0.92
33	<i>Shandong zhanhua shengyuan jiancai youxian gongsi</i>	2,916.00	0.91
34	<i>Shandong heze tengda dianli youxian</i>	2,861.00	0.90

	<i>gongsi</i>		
35	<i>Shandong ludian touzi youxian gongsi</i>	2,850.00	0.89
36	<i>Shandong liaocheng saida shiye youxian zeren gongsi</i>	2,790.00	0.87
37	<i>Liaochengshi kangqiao shangmao youxian gongsi</i>	2,768.00	0.87
38	<i>Shandong chenming konggu youxian gongsi</i>	2,614.00	0.82
39	<i>Shandong bingzhou dongli dianqi youxian zeren gongso</i>	2,542.00	0.80
40	<i>Shenzhen yangtong chuangye touzi youxian gongsi</i>	2,470.00	0.77
41	<i>Rizhao hongyun dianli fazhan youxian gongsi</i>	2,463.00	0.77
42	<i>Jining longyuan gongmao youxian gongsi</i>	1,997.00	0.62
43	<i>Rizhao yangguang shiye youxian gongsi</i>	1,945.00	0.61
44	<i>Weihai dianli anzhuang gongsi</i>	1,942.00	0.61
45	<i>Laiwu kaiyuan keji jingmao youxian gongsi</i>	1,617.00	0.51
46	<i>Taian haili kemaoy zhongxin</i>	1,391.00	0.44
47	<i>Shanying tongyuan touzi youxian zeren gongsi</i>	1,311.00	0.41
48	<i>Qingdao haiqing baichuan luyou kaifa youxian gongsi</i>	640.00	0.20
49	<i>Shandong huakang shangmao youxian gongsi</i>	632.00	0.20
50	<i>Taian qinyuan jingji maoyi youxian zeren gongsi</i>	64.00	0.02

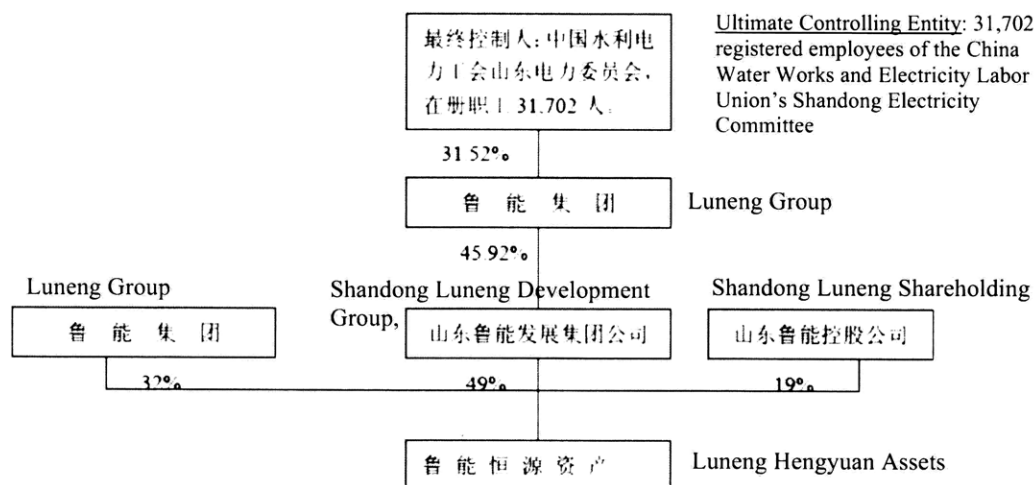
Source: Zhengquan Shibao, "Guangning fazhan gongbao zhengwen di 000537 hao: 'Xiangcai zhengquan youxianzeren gongsi guanyu tianjin kai gede gufen youxianzeren gongsi zhongda zichan goumai youguan qingkuang zhi hecha baodao'", November 26, 2004.

#### Mixing State and Firm Assets

Luneng Group immediately began purchasing stakes in a range of existing SPPC subsidiary firms, ranging from SLDC (the core of the electric power portfolio) to Luneng Hengyuan Assets (that had been created to serve as an enterprise management consulting service provider). By the end of 1999 Luneng Holdings alone managed 18 specialized firms and 391 independent legal person units (*duli faren danwei*), while the provincial power company, either through the labor union or direct equity investment, had

successfully managed to purchase shares in SLDC, Luneng Holdings, Taishan Cable, LN Construction, Luneng Tech, SDLN electronics, and a range of other firms.<sup>319</sup> By 2001 SLDC employed 3600 individuals, had recorded RMB 4.17 billion in operating capital and was a partial owner of 38 firms, sole owner of three firms, three wholly owned subsidiaries, and six branch offices.<sup>320</sup> Additional subsidiaries continued to be created. In September 2000 Shandong Xinyuan Holding Co. was established with registered capital of RMB 1.8 billion and had become the main financing arm of Luneng Group.<sup>321</sup>

**Figure 32. Luneng Group and Subsidiaries, 1999**



Source: “Tianjin nankai gede gufen youxian gongsi zhongda zichan goumai baogaoshu”, August 8, 2004, p.4.

By early 2003, China’s 21<sup>st</sup> Century Economic newspaper (*ershiyi shiji jingji baodao*) questioned how RMB 3.1 billion of employee capital could control RMB 36.0 billion of state-owned assets. The title of the article was “Luneng secretly privatizes –

<sup>319</sup> Major firms under management included *Shandong luneng touzi gongsi*, *Luneng fazhan gongsi*, *Luneng dianli ranliao gongsi*, *Luneng dianli wuye gongsi*, *Luneng xinyi gongsi*, *Luneng yingda shiye gongsi*, *Luneng xintong gongsi*, *Luneng zhiye gongsi*, and *Luneng kuangye gongsi*. See Xiao Jide, “Luneng zhi yuan”, *Dianqi Shidai* (Dianqiyeshi chubanshe), vol. 6. 2002, p.19.

<sup>320</sup> Sun Shuxin, “genshenyemao luyicantian – ji shandong luneng fazhan jituan youxian gongsi”, in *Shandong Shuiwu Zongheng*, 2001 no. Z1, p.3.

<sup>321</sup> <http://finance.people.com.cn/GB/67815/68055/4828500.html>. “Shandong xinyuan kongguo gongsi”.

RMB 3.1 billion of raised employee funds controls RMB 36.0 billion of state assets”.<sup>322</sup> Soon after the article was published, Chen Wangxiang, vice director of the China Investment Association’s Energy Economic Institute sent a letter to the State Council asking the central government to investigate. No investigation was forthcoming, however Luneng’s raised profile did result in policy changes. By August 2003 SASAC issued document number 37 “Temporary Suspension of Electric Power Employees Investing in Electric Power Enterprises” (*zhanting dianli xitong zhigong touzi dianli qiye*). This notice temporarily suspended the investment of electric power industry employees from investing in electric power firms, however the effect was not immediately felt and employee invested power firms continued to grow. By December 31, 2005, Luneng Group boasted total assets of RMB 73.8 billion, as estimated by the director of the Shandong provincial subsidiary of the National Bureau of Statistics.<sup>323</sup>

#### Full Privatization as Catalyst

After rapid expansion as a local firm majority owned by a provincial SOE labor union, on May 27, 2006 Luneng Group’s shares were fully privatized. For a total of RMB 3.73 billion, the Shandong labor union sold its 31.52 percent share and 46 other shareholders sold their cumulative 60.09 percent shares to two private firms: Shouda Energy and Beijing Guoyuan United.<sup>324</sup> Three of the original 50 shareholder firms, Jinan Tuoneng Investment Company, Shandong Ludian Investment Company and Shandong Fengui Investment Company, all remained unwilling to sell and therefore maintained their minority shares at 8.39 percent. This remaining share quickly declined to 4.12 percent. During the third shareholder meeting of 2006, on June 28 2006, Shouda Energy

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<sup>322</sup> “Shandong antui minyinghua – 31yi yuangong jizi kongzhi 360yi guoyou zichan”

<sup>323</sup> Sinocast, “Luneng Clear Employee Ownership”, August 6, 2006.

<sup>324</sup> “Beijing guoyuan lianhe youxian gongsi”, “Shouda nengyuan jituan youxian gongsi”.

subsequently increased its investment by RMB 1.68 billion to own 38.59 percent of Luneng Group. Similarly, Guoyuan United then increased its investment by RMB 2.03 billion to own 57.29 percent of the firm.<sup>325</sup> In total, RMB 7.44 billion was paid by two private firms for 95.88 percent ownership of Luneng Group. Now fully private, Luneng began to purchase the remaining shareholders of certain subsidiary firms, such as Hengyuan, which held the majority (62.35 percent) of the real estate portfolio affiliated with Luneng.<sup>326</sup> At the completion of these consolidations into private hands, one individual, Zhao Xingyin, owned 28.30 percent of Luneng Group.<sup>327</sup> Both buyers were little known, even within the electricity industry, and had been recently established. Guoyuan United had been created in March 2004 with registered capital of RMB 2.50 billion while Shouda was incorporated in October 2001 with registered capital of RMB 1.20 billion.

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<sup>325</sup> Zhong Zheng Net, “*Zhao xingyin cheng luneng jituan shiji kongzhiren*”, January 17, 2007. See also Board of Directors Report No. 49, Shandong Luneng Taishan Cable Company, “*Shandong luneng taishan dianlan gufen youxian gongsi guanyu konggu gudong de guquan zhuanrang tishixing gonggao*”, 2008, p.4.

<sup>326</sup> Caijing, “*Shei de Luneng?*”, January 8, 2007; Interview SD-24.

<sup>327</sup> Zhong Zheng Wang, “*Zhao xingyin cheng luneng jituan shiji kongzhiren*”, January 17, 2007. See also Board of Directors Report No. 49, Shandong Luneng Taishan Cable Company, p.4.



to vote in board meetings were then suspended.<sup>328</sup> By late 2007 the State Grid Corporation of China had also sent a report to SASAC, criticizing the privatization of Luneng Group and the potential privileging of dispatch in the Shandong provincial grid. On December 29, 2007 SASAC had promulgated document number 494, outlining steps for the return of Luneng's assets to the central government.<sup>329</sup>

On February 4, 2008 95.47 percent of Luneng Group's shares were sold for RMB 8.32 billion to the Shandong Provincial Power Company, the Shandong Electric Power Labor Union, and Luneng Wuye Company. The provincial power company became the majority shareholder, with 77.14 percent ownership. The provincial power company is a wholly owned subsidiary of the State Grid Corporation of China. The State Grid in turn is wholly owned by the central government through SASAC (see Appendices for ownership charts).

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<sup>328</sup> Zhengquan Shibao, "Lunengxi jiang zhonggui shandong dianli jituan", February 5, 2008. <http://stock1.jrj.com.cn/news/2008-02-05/000003270348.html>.

<sup>329</sup> SASAC document number 494, "Guanyu guanche luoshi guozhiwei guoziting chanquan" 2007-494 haowen shishi fangan de pifu". See Caijing, "Shandong dianli 83 yi shouhui luneng jituan", February 25, 2008.

**Figure 34. Luneng Group's Nationalization by the Numbers, 2008**

<b>Seller</b>	<b>Share in 2006</b>	<b>Price Paid 2006 (RMB million)</b>	<b>Buyer</b>	<b>Price Paid 2008 (RMB million)</b>	<b>Differential (RMB million)</b>
Guoyuan	61.79%	4,795	SPPC (Provincial SOE)	5,387	+592
Guoyuan	1.31%	101	Luneng Wuye (Provincial SOE Subsidiary)	113	+12
Shouda	15.35%	1,191	SPPC (Provincial SOE)	1,338	+147
Shouda	17.02%	1,320	SD Labor Union (Provincial SOE Employees)	1,484	+164
<b>Total</b>	<b>95.47%</b>	<b>7,407</b>		<b>8,322</b>	<b>+915</b>

Luneng Group was nationalized by the central government and returned to its original owner – the Shandong Provincial Power Company, itself owned by the State Grid Corporation of China.<sup>330</sup> It is important to note that final nationalization did not take the form of direct expropriation. Shares not only were purchased, but purchased at a modest increase of the 2006 prices paid by the private firms. In this way, intervention by the central state was the combination of regulatory enforcer (as the sale was non-negotiable and much of the executive leadership of Luneng Group were arrested and placed under investigation) and market actor through share purchasing. Shandong Provincial Power Company purchased a majority 77.14 percent share of Luneng Group, while original employee shares through the labor union and original shareholder Luneng Wuye were also compensated.

<sup>330</sup> SinoCast China Business Daily News, “Shandong Electric Takes Helm of Luneng Group”, February 26, 2008, p.1.

At this stage, the major – and critical – difference between the Luneng and Jinyuan cases was that Luneng’s assets were being returned to the provincial SOE with which the firm (and its founders) were originally affiliated. This placed the firm under the direct operational and ownership control of the central government, which owned the provincial power company through the State Grid Corporation. Jinyuan’s reform allowed the partial purchase of assets by the smallest of the listed “Big Five” generating firms, with an indirect link to the central government through ownership (eventually) and not operation. However, the liberalization measures of reform presented the central government with a significant problem. The return of power generation assets to a provincial power company that was a subsidiary of the State Grid Corporation directly violated the reforms relating to the separation of power generation and grid asset ownership. As this study has outlined, and the government had discovered after many trials, dispatch manipulation under such circumstances was a distinct challenge. As a result, 4.95 GW of Luneng Group’s total of 5.69 GW of generation assets located physically within Shandong were transferred to Huaneng Group (the largest of the “Big Five” listed SOE generating firms) on December 11, 2008. The selling of additional installed capacity to Huaneng Group allowed the central government to even out competition in the province as well. After the purchase, Huaneng’s installed capacity in Shandong equaled that of its main central government SOE competitor in the province, Huadian Group, another “Big Five” firm that owned over 10 GW of capacity.

This decision solved the conflict between reforms and the nationalization, yet maintained the first difference between the two cases and created another difference. First, the Shandong Provincial Power Company (under the State Grid Corporation)

continues to have operational control over these assets (grid and generating). While Huaneng won the right to derive a revenue stream from Luneng's activities, the central government granted authority over the assets to the State Grid subsidiary. This authority allowed later asset reallocation and restructuring decisions to be executed by the State Grid Corporation rather than Huaneng. The complexity and extent of opacity relating to the asset acquisitions fueling Luneng Group's rise rendered the firm unfit to be sold to another corporation with full operational and management rights, as was the case with Jinyuan.

Second, unlike the Guizhou electric power labor union employees who had invested in Jinyuan and were able to maintain their ownership (although diluted in relative terms), the Shandong electric power labor union employees were unable to maintain their considerable investment in Luneng. They were forced to sell to private investors in 2006 by the Shandong Provincial Power Company executives, and forced again to sell to Huaneng by the central government. These employees therefore bore initial risks of early investment and then were unable to maintain their rights to manage their investment. Moreover, the prices at which they were forced to sell were a derivative of the already low, negotiated and non-transparent price at which the privatization occurred.

## CHAPTER FIVE Implications for Theory and Policy

*“Delegation never meant loss of power...Ultimately, the privatization of taxation certainly reflected increased dependence of the state on the private sector and especially on financial auxiliaries, and an undeniable failure of the monarchical administration to adapt to cope with its growing needs. But the privatization never meant the loss of influence of state power. The state power retained indirect control over the world of finance and was assured of fiscal and financial revenue; its intervention was fitful and often arbitrary, but it was particularly effective. This choice of an indirect, partly privatized mode of management characterized the French absolute monarchy regime for about two centuries – a regime that cannot be described as impotent.”<sup>331</sup>*

### Summary of Findings

China’s national energy sector in the past three decades has expanded on a scale that is historically unmatched, and in 2005 China became the world’s largest energy producer. Such growth occurred during a period of time in which economic liberalization reforms in the energy sector rapidly diffused internationally. This dissertation analyzed the investment and ownership structure of production in China’s coal and electric power industries during this period. The motivating research question for the study addressed the extent to which China’s central state devolved ownership and investment levels in these critical energy industries to other actors. In effect the study asked, to return to the first paragraph of the dissertation, whether Beijing had begun to “steer” as opposed to “row” the ship driving China’s national energy sector production.

The study found, through examination of coal and electricity industry level data as well as two case studies, that central state ownership and investment growth in these critical industries fluctuated over time, largely according to the national electric power balance. Moreover, the consolidation of energy regulatory institutions at the central state level also fluctuated in related patterns, revealing shifts in central state policies in the

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<sup>331</sup> Hibou, p.27.

sector. These findings run counter to what the dominant theories in the literature would otherwise predict. Neo-liberal theory would predict the incremental reduction of central state ownership in these sectors, as is evident in many of China's other industries and in the coal and electric power generation industries of other rapidly developing economies. Other arguments, centered on the ability of the central state to sustain "self-reproducing authoritarianism", would predict fairly stable levels of central state investment and ownership in this strategic sector through time as well as the presence of quite limited liberalization. Finally, a theory privileging elite politics would indeed predict fluctuations, yet at different turning points in time than those found in this study, and without the sustained pattern that is evident in the extended time period under examination, a period that spans four distinct political eras.

In the coal industry, periods of high economic growth (above nine percent) led to national electricity balance deficits in which the growth of electricity consumption exceeded the growth of installed electric capacity. During such periods of economic growth (1982-1988, 1992-1995, 2001-2005), coal demand also grew rapidly while Central State-owned (CS) and Local State-owned (LS) coal production capacity growth grew either moderately, stagnated, or in some cases declined. In contrast, Local Non-State (LNS) coal production (TVEs, private, and "other" ownership forms) grew during these periods at rates that were multiples higher than the highest state-owned production levels. In absolute production terms, LNS production levels well exceeded LS levels by 1984 and CS levels by 1993, even though significant LNS output was often not captured by official statistics. Once high levels of economic growth subsided and electric power surplus returned, this LNS production capacity, despite documented levels of higher

relative efficiency, experienced low or negative growth rates that either converged with CS and LS rates or were significantly lower than such rates. Put simply, this LNS production capacity therefore effectively served as a “shock absorber” of the coal system during very high or very low growth periods.

In the electric power generation industry, a similar pattern was evident in the foreign and domestic investment data. The introduction of local domestic capital investment first began during the same high economic growth period of the mid 1980s, and again was supplemented with major increases in foreign investment and technology systematically courted during the boom of the early 1990s. The onset of the Asian Financial Crisis and plunging economic growth rates beginning in late 1997 witnessed a systematic and nearly comprehensive disappearance of foreign investment, followed by the drop of a variety of local domestic private and hybrid investment in electric power generation. The two case studies provide firm-level evidence both of the manner in which such local firms negotiated these shifts, and of the ways in which the most recent economic downturn led to consolidation of central state ownership and the conversion of both domestic local firms to central state ownership.

At the central state level, the structure of regulatory institutions overseeing the energy sector experienced similar fluctuations. During periods of slower economic growth and electric power generation surplus, of coal and electricity industry structure consolidation, of rising levels of central state investment and ownership, and of slowing economic growth rates, central regulatory institutions governing the energy market also consolidated. China’s State Energy Commission governed between 1980-1982, when economic growth dipped to five percent and averaged seven percent. The Ministry of

Energy, another short-lived attempt at consolidation, was created in mid-1988 and eventually dismantled in 1993. During this period GDP growth dropped to under four percent, its lowest point in the past three decades. The establishment of the de facto electric power monopoly, the State Power Corporation of China (SPCC), and the most significant closing of over 10 central state ministries occurred between 1997 and 1999, when the Asian Financial Crisis affected China's economy and revised independent GDP growth estimates averaged five to six percent.<sup>332</sup> During periods in which high economic growth rates resumed, the structure of the coal and electricity generating industries diversified, and non-central state-owned actors invested at scale, the central state regulatory institutions similarly diversified in an effort to manage the greater complexity of the industry.

#### Summary of Argument

This study best explained such long-term fluctuation in industry structure by constructing a state-centered argument in which China's central state seeks to mitigate the considerable economic and political risk inherent in securing adequate national energy supply by managing the coal and electric power generation firms as a portfolio of assets. Rather than allow creeping liberalization to reduce incrementally the share of state-owned energy production or sacrifice sustaining high rates of economic growth by maintaining policies that undermined local and foreign investment and ownership, the central state actively manages the composition of investment and ownership types in these strategic industries. Much of this was and is accomplished through the stable central state regulatory institutions intimately involved in the energy sector (including the

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<sup>332</sup> Albert Keidel, formerly of the Carnegie Endowment, produces much of the most recent reliable revised estimates of GDP growth, calculated from national expenditure figures.

NDRC and the Central Organization Department (COD) of the Party). Such composition is managed largely through changes in policies regulating mechanisms of market access through project approval, contract pricing and terms, forced direct mergers by central state-owned firms and personnel. The study tracked these policy changes on an individual level and major shifts were also measured at the macro level through the alternating consolidation and diversification of regulatory institutions within the central state. As stated previously, these policy shifts coincided with national electricity balance shifts, as major changes in economic growth either strained or eased central state-owned energy production capacity.

Functionalist analysis is most useful in understanding the central state's active periodic support of non-central state firms during times of high economic growth rates and inadequate energy supply. During these periods Central State-owned (CS) and Local State-owned (LS) coal production capacity growth stall or increase at a rate significantly lower than demand growth. As has been well documented by others, such state-owned coal capacity is both inefficient and often lacking sufficient finance capital to meet such major demand increases. High rates of annual economic growth (usually above nine percent) thus strain existing limited state-owned energy production capacity and create a functional need for the state to identify alternative means to increase supply. This functional need requires changes in formal policy ranging from contract terms (rate-of-return agreements, depreciation rates, tax incentives) to market access and pricing. Under such circumstances, the central state elects to dilute its ownership and investment, thus expanding the portfolio of types of firms participating in coal and electric power provision.

However, despite such significant economic liberalization reform in the coal and electric power industries as well as the efficiency of this local- and foreign-owned capacity, the corresponding ownership and investment share of production in these industries have not gradually superseded that of central state-owned firms. Instead, periods of lower growth and energy surplus provide the opportunity for the central state to reassess industry structure. Were the state's portfolio approach strictly functionalist in nature, the often less-efficient central state-owned firms in coal and electric power generation would be shuttered during periods of energy surplus, as their output is no longer needed and they are less able to fulfill demand efficiently. Instead, the central state often uses such periods to remove local- and foreign-owned competitors from the market. Some of these firms are closed down while others are allowed to be consolidated by eager central SOE incumbents. This occurs because these periods of lower growth remove the pressures of short supply and allow ideational concerns over ownership in this critical industry to regain political force. Ideational resources and rhetoric that are rendered secondary to ensuring adequate energy supply are regularly redeployed and re-emphasized once such supply is met. The central state then accomplishes such change in ownership and investment through the exercise of, primarily, levers of market access, contract price parameters, and personnel management that remain under the authority of stable central state entities such as the NDRC and COD. China's coal and electric power industries are therefore best understood as actively managed portfolios of firms, not the self-regulating systems of market actors that strict functionalism would suggest.

### *Theoretical Implications*

Jonah Levy, writing of the convergence/divergence debate in political economy

between neo-liberal scholars and scholars focused on the persistence of institutional diversity in the advanced industrialized economies, argues that scholars of the second camp, who temper the first camp's "demise of the state" argument by forwarding evidence of state inertia, do not develop their criticism to its logical endpoint. Rather, many of these scholars "leave unchallenged the presumption that contemporary change pushes in a single direction, toward the reduction of state intervention."<sup>333</sup> Levy concludes that as a result of such omission "politics is destined to defend an ever smaller, less relevant, and embattled sphere of state activity across time."<sup>334</sup> The dominant theoretical arguments reviewed in this study share this evolutionary assumption.<sup>335</sup>

The literature reviewed in this study has greatly advanced our collective understanding of the changing role of the state in economic development and the range of mechanisms available to the state and firms in negotiating such change. Proponents of the neo-liberal camp have rightly highlighted the importance of economic liberalization, if not outright privatization, in strengthening productive economic activity and these arguments have been made forcefully in application to the energy sector. The importance of such reforms in boosting China's economic growth and energy production growth is considerable. In contrast, scholars arguing that later-developing countries require interventionist and activist states to achieve industrialization goals, particularly in the capital-intensive and strategic energy sector, rightly highlight the many ways in which neo-liberal blueprints for reform do not address the wide variety of institutional contexts

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<sup>333</sup> Jonah Levy, *The state after statism: new state activities in the age of liberalization* (Cambridge: Harvard University Press, 2006), p.13.

<sup>334</sup> Levy, p.13.

<sup>335</sup> As Yasheng Huang (2008) repeatedly observes, even scholars that forward the third approach discussed in this study, focused on elite politics, argue that China's leadership has incrementally increased support of economic liberalization policies since the initial reforms of the late 1970s.

in the developing world. Such scholars cite China's form of energy governance as evidence of this view, a leading example of the manner in which a self-reproducing authoritarian state has successfully overcome late-developer challenges (through what they characterize as marginal liberalization measures) and has nevertheless achieved rapid energy production growth. Such wide-ranging debate is perhaps understandable given the fluctuation in central state ownership and investment over time that this study documents. Careful selection of data from selectively biased time periods could marshal evidence for either view.

However, both arguments implicitly argue that economic liberalization policies are the ultimate goal of reform, rather than simply a means to sustain growth. Both arguments implicitly argue that for industry to grow in the long-term, the state must eventually shift its role from that of "rowing" and of providing the driving force for industrial development, to that of "steering" and of providing the regulatory guidance for such development. Neo-liberals argue that successfully productive industries and national economies must begin early to follow a reform path that reduces direct state involvement in the economy. Neo-developmental statisticians argue that historical timing matters and that given the challenges that "later-developing" economies have in competing with the advanced industrialized economies, state involvement must first ramp up to provide a variety of resources for industrialization, and only then be dismantled largely along the lines of the neo-liberal prescription. As Danny Breznitz writes: "...the neo-development argument implicitly calls for the state to manage a process in which it lets the industry gain more and more power to decide its own future as it finds its feet and grows. Hence, the state needs to be able to change its role from that of initiator and

leader to that of supporting actor.”<sup>336</sup> Both approaches view economic liberalization as a reform goal – a progressive and uni-directional set of policies that cumulatively narrow state economic policy options as the market transactions to be regulated become ever more complex.

As a result of this shared assumption, the interventionist tools of state-led “late development”, often linked to authoritarian regimes like those found in Taiwan and South Korea during their early post-war industrialization periods, are framed in temporal and sequential opposition to the market-enabling neo-liberal tools of market development. While both camps argue whether state-led approaches produce growth and industrialization, both agree that economic liberalization eventually follows state-led tools of development as outlined by Gerschenkron and others. As argued in Chapter One, this study’s findings suggest that these are not separate models, but rather collections of tools available to the state on a policy continuum that remain available to the state through time.

The study’s first main implication is that neo-liberal means can be deployed to achieve state-led ends. At the firm level, the Jinyuan Group case provides clear illustration of this point. Jinyuan, a firm founded with private capital and linked to local government, was a product of liberalization policies and became able to access the nation’s electric power generation and coal markets. In doing so, it became a linchpin of what arguably became China’s largest modern central state-led infrastructure project: the “Develop the West” campaign and the related West-to-East-Power-Transmission-Project (WEPTP). Similarly, at the industry level, it is clear from China’s coal and electric

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<sup>336</sup> Dan Breznitz, *Innovation and the State: Development strategies for high-technology industries in a world of fragmented production: Israel, Ireland, and Taiwan* (New Haven: Yale University Press, 2007), p.31.

power generation industry data that in periods of high economic growth, neo-liberal policies of loosening prices and diversifying ownership can be pursued by the state to achieve goals of “late development”, such as rapid capital agglomeration and industrialization, only to then be curtailed in periods of lower growth.

Second, the study provides evidence that economic liberalization reform need not be incremental and is, in fact, reversible. Use of neo-liberal policies does not preclude the state from reasserting traditional interventionist policies later in the development process to consolidate central state ownership, despite the creation of powerful firms and local state interests in the process of reform. As stated in Chapter One, China’s central state has proven quite successful in allowing periodic reductions in state ownership, pricing authority, and monopoly producer rights to ensure the growth of what is arguably the most politically critical sector of the economy. It has also proven capable of reasserting its claims on assets when private, local state, and foreign sources of investment are perceived to be no longer necessary to satisfy development objectives. It is during these periods that ideological concerns privileging central state ownership, always present, return to enjoy political currency.

The study documents several examples of such central state reassertion. For example, in the electric power generation industry, the electric power deficits of the early to mid-1990s resulted in the major overhaul of market access terms, project rate-of-return terms, tax incentives, depreciation rates, on-grid price guarantees, approval procedures and other policies by the central state to attract systematically foreign investment and high efficiency power generation technology. As quickly as such investment ramped up, it collapsed when all such seemingly long-term and long-cycle policies were

systematically revised to exclude foreign investment during the Asian Financial Crisis and the resulting economic slowdown beginning in 1997. Both cases illustrate how far-reaching these shifts in central state policy changes can be, restructuring the ownership and investment of domestic firms as well. The cases provide detailed evidence of how two highly independent, sophisticated and large-scale local firms with a range of differences in geography, levels of economic development, and levels of local government support, both undergo ownership conversion and are consolidated with large central state-owned firms within months of one another.

Such shifts towards industry structure consolidation and away from economic liberalization are equally clear in the study's treatment of the coal industry. For example, during the rapid rise of local and foreign investment in the electric power generation industry of the early to mid-1990s, described above, a similar diversification of financial sources was occurring in coal production capacity. Local non-state coal production capacity rose from a third (36 percent) of total production in 1990, to one-half (48 percent) in 1996. After the Asian Financial Crisis and central state ownership consolidation, local production capacity dropped to a low of 28 percent in 2000, despite the higher capital and labor efficiency of local mines.<sup>337</sup> In sum, the industry level data and case studies support the main argument of this study and illustrate the ability of the central state to manage the ownership and investment structure of the energy sector over time.

Third, the case studies reveal that firm decisions have a significant impact on the execution of these powerful and broad central state policy changes that periodically reshape the structure of China's energy sector. Despite the fact that both firms were

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<sup>337</sup> Even if estimates of underreported local coal production are included, the share is still quite low.

eventually consolidated with large central state-owned firms, considerable differences in corporate management and structure remained after such conversion, highlighting the importance of a firm's past decisions of asset acquisition, shareholder treatment, and corporate governance.

Jinyuan Group, a firm that was built upon greenfield plant construction and was careful to manage through lease, and not own, pre-existing electricity assets owned by the central and/or local state, was not perceived as stripping state assets in the course of meeting local economic development needs. As discussed, the firm's model of employee ownership was even supported and encouraged by the central state's SASAC in recent years among firms owned by SASAC. Moreover, the broad range of shareholders remained shareholders throughout the course of Jinyuan's rise and not forcibly removed through opaque privatization to outside investors. While undoubtedly not the paragon of corporate governance, Jinyuan nevertheless represented to the central state resourceful local actors building a productive firm with fairly consistent, diversified ownership representation and with relatively transparent asset management practices. When conversion to central state ownership occurred, the firm was merged with the smallest of the "Big Five" listed generating firms through a sale of 60 percent of its ownership. Employee and local government ownership was certainly diluted, but the diversification of ownership remained, many of the mid-level executives remained in place, and the assets were not simply merged directly with the local government firm from which many of Jinyuan's executives originally came.

Luneng Group, also a local state-owned firm producing electricity that began with private capital and then diversified through local government capital infusions and human

assets transferred from local SOEs, made different decisions relating to physical asset management. Luneng's growth strategy included greenfield plants and the transfer of assets from the electricity generating firm owned by the provincial government to Luneng. In addition, the original employee shareholders, whose investment bore the initial risk before the firm became successful, were disenfranchised later when the firm was privatized and sold at negotiated non-market prices to two outside investors. Several shareholders attempted to block the sale. This opaque form of growth was very much viewed as asset stripping by the central state, and Luneng was consolidated and converted to central state ownership. Unlike Jinyuan, Luneng's assets were not purchased immediately by one of the "Big Five" listed firms. Authority over Luneng's assets was transferred to the Shandong Provincial Government SOE from which many of the assets were originally stripped. Only then was the ownership of such assets transferred to Huaneng Group, the largest of the "Big Five" central state-owned electricity generating firms. The management authority remained with the provincial government, however. It is important to note here that Luneng and Jinyuan were consolidated during a period of energy surplus and during the beginning of an economic downturn, following the larger pattern described in this study.

### *Policy Implications*

This study also raises important implications relating to public policy, and in particular the ability of the Chinese state to fulfill aggressive greenhouse gas emission reductions in an effort to mitigate climate change. Rapid environmental degradation is arguably the greatest long-term governance challenge facing China's leadership, and the energy industries that served as the focus of this dissertation – coal and electric power

generation – are central to the design of viable solutions. China’s supply side energy growth strategy was largely successful in meeting demand, as this dissertation illustrates, but also created significant unintended consequences. As Emily Yeh and Joanna Lewis write:

“not everything is working out according to the party-state’s plan to maintain control while also reaping the fruits of partial reform...unintended consequences include growing regional inequality and environmental problems stemming from both coal combustion and large-scale hydropower projects. Although not wholly unintended, the possible challenges to state legitimacy arising from these effects may be greater than Party reformers anticipated. Indeed, the consequences of the CCP’s plans for power sector reform are likely to exacerbate all of the big-picture challenges facing the CCP in this new century, particularly those related to the environment, corruption and the need for serious political reform.”<sup>338</sup>

This final section will outline briefly the interdependence between these two industries and China’s climate challenge, then suggest how two of the theoretical implications discussed previously may best inform policy analysis moving forward.

China’s utilization of coal has enabled the nation to maintain high levels of energy self-sufficiency but has also elevated it to become the world’s leading greenhouse gas emitter. Coal combustion accounted for an incredible 82 percent of China’s total national emissions in 2006.<sup>339</sup> The corresponding figure for the US is 36 percent, largely because of petroleum’s large contribution to US energy supply. In particular, coal also produced nearly 90 percent of China’s sulfur dioxide (SO<sub>2</sub>) and over two-thirds of the country’s carbon dioxide (CO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>). The electric power industry’s demand for coal is most responsible for these figures, with China’s electric power industry accounting for the single largest contribution of air pollutants. The local cost of health damage from air pollution is considerable, projected to equal 13 percent of

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<sup>338</sup> Emily Yeh and Joanna Lewis, “State power and the logic of reform in China’s electricity sector,” *Pacific Affairs* (2004), p.464.

<sup>339</sup> Energy Information Agency, US Department of Energy, *International Energy Annual, 2006*.

China's GDP by 2020 under the business-as-usual (BAU) scenario, as estimated by an OECD study.<sup>340</sup> Chinese researchers are tracking the impact of climate change on China, citing an array of variables including decreasing crop yields and river run-off, rising sea levels of 1.4-3.2 millimeters (mm) annually along the coastal areas, decreasing sea ice in the Bohai Sea and Yellow Sea, significant loss of glacial areas in the northwestern regions, and thinning Tibetan permafrost.<sup>341</sup> The impact of China's continued supply side solutions has already registered globally.<sup>342</sup> While it is clear that the developed world, led by the US and Europe, has contributed the vast majority of the current stock of CO<sub>2</sub>, moving forward, the EIA has estimated that China will produce well over one quarter of world CO<sub>2</sub> emissions through 2030, while the US will contribute less than 20 percent.

Recognition by the central state of this daunting range of complex challenges has dramatically increased. At the domestic level, a "National Climate Change Program" report was released June 4, 2007 and quickly followed by a "Climate Change White Paper" in October 2008. These documents sought to catalog Chinese efforts to date to address climate change. A range of legislative actions have also been adopted. Most notably in the legal realm, the Renewable Energy Law of 2005 was followed by the Energy Conservation Law of 2008. How best to execute and implement these new laws was captured by the NDRC-issued "Medium- and Long-Term Development Plan for Renewable Energy" as well as a report entitled "Several Opinions Regarding

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<sup>340</sup> World Bank, "Cost of Pollution in China: Economic Estimates of Physical Damages" (Washington: World Bank) 2007.

<sup>341</sup> Lin Erda, Xu Yinlong, Wu Shaolong, Ju Hui, Ma Shiming, "China's national assessment report on climate change (II)", *Advances in Climate Change Research* 3 (Suppl. 2007), p.7. [www.climatechange.cn/qikan/manage/wenzhang/02.pdf](http://www.climatechange.cn/qikan/manage/wenzhang/02.pdf)

<sup>342</sup> For an informative view regarding China's approach to climate change, please see Joanna Lewis, "China's Strategic Priorities in International Climate Change Negotiations," *Washington Quarterly* 31, no. 1 (December 1, 2007): 155-174.

Acceleration of Shutting down Small Thermal Power Generating Units”. The 11th Five-Year Plan (2006-2010) also contained numerous references to addressing energy conservation and related policies.<sup>343</sup> At the international level, China ratified both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Such ratification of course came with little cost as China’s status as a developing country allowed the emissions targets to be non-binding and merely notional. China has been engaged in the carbon market and financial mechanisms created by Kyoto, quickly rising to become the world’s largest seller of Clean Development Mechanism (CDM) credits. As of 2006 China accounted for 61 percent of global CDM sales volume.<sup>344</sup>

While China’s ability to deliver the energy necessary for economic growth through supply side management has been considerable, its future energy (and increasingly environmental) needs are clearly more complex than simply meeting soaring consumption with *supply* side solutions. As the IEA’s 2007 World Energy Outlook made clear, China’s approach to energy growth that has privileged supply side solutions over demand side solutions will not meet the nation’s future needs. The combination of a rapid corporatization of energy assets, national energy demand on pace to soon surpass that of the US, and strong continued investments in heavy industry have created pressing regulatory challenges on the *demand* side of the energy equation. The recent leveling of energy intensity levels is troubling. Had such dramatic reductions in energy intensity not taken place and had the energy intensity levels of 1980 remained static, China would

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<sup>343</sup> Congressional Research Services (CRS), “China’s Greenhouse Gas Emissions and Mitigation Policies” (September 10, 2008), p.19.

<sup>344</sup> Karan Capoor et al., “State and Trends of the Carbon Market, 2007” (World Bank Carbon Finance Unit, 2007).

have burned twice as much coal in 1995 than needed to produce that year's GDP.<sup>345</sup>

Between 2002 and 2005 the historical trend of declining energy intensity reversed itself, and energy consumption grew at a rate faster than economic output (see Figure 35). In recognition of such a trend, energy intensity reduction targets were one of the few quantitative goals enumerated in the 11<sup>th</sup> Five Year Plan. These targets have not been met thus far. On March 9, 2009, Chairman of the National People's Congress (NPC) Standing Committee Wu Bangguo delivered the committee work report during the second plenary session of the 11<sup>th</sup> NPC. The report specifically highlighted this failure to meet efficiency goals (*italics added*):

“...two major binding targets - *energy consumption per unit of GDP* and total emissions of major pollutants - fell far short of the set goals. To a great extent this showed that the pattern of China's economic development had not been transformed fundamentally: industry still holds the dominant position in the industrial structure, exports and investment still play the leading role in the demand structure, and serious problems such as mounting pressure on resources and the environment, increasing difficulty in expanding employment, and insufficient consumption still exist.”<sup>346</sup>

The 11th Five Year Plan calls for China's energy intensity in 2010 to be 20 percent below 2005 levels. This would require an annual reduction of about 4.5 percent between 2006 and 2010. However, 2006 resulted in a reduction of a mere 1.23 percent and 2007 achieved a still-low 3.27 percent. Mid-2008 reduction figures equaled 2.88 percent.<sup>347</sup>

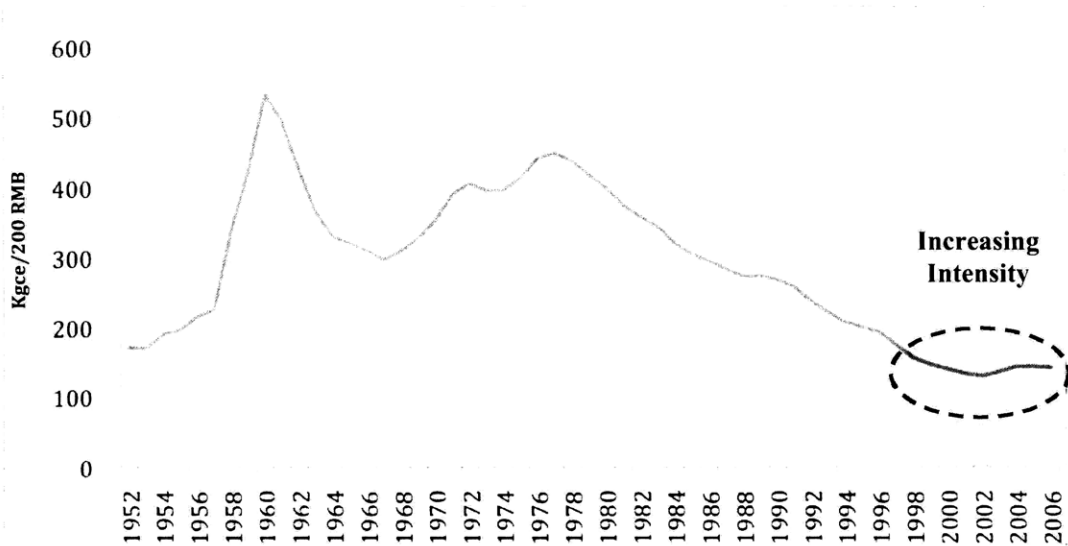
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<sup>345</sup> Smil (1998), p.947.

<sup>346</sup> [http://news.xinhuanet.com/english/2009-03/16/content\\_11018210\\_1.htm](http://news.xinhuanet.com/english/2009-03/16/content_11018210_1.htm).

<sup>347</sup> Philip Andrews-Speed, “China's ongoing energy efficiency drive: Origins, progress and prospects,” *Energy Policy* (2009), p.4

**Figure 35. Energy Intensity Trends**



The lack of reductions in energy intensity, combined with heightened urbanization and continued industrialization trends, may be outstripping the ability of local actors to invest in domestic infrastructure, despite the current stimulus package under consideration by the central government. 90 percent of China's coal reserves are located in the hinterland while the vast majority of its demand and industrial centers are located in the coastal areas. Failure to mitigate energy intensity will exacerbate this strain and will increase demand growth over the next decade to much higher absolute levels. Significantly, China became a net coal importer in the first half of 2007, signaling pressures on this infrastructure.

Changing China's emissions trajectory will therefore require: i) significant investment and policy strengthening in efficiency-enhancing supply side and demand side management; ii) significant investment in some form of Carbon Capture and Sequestration (CCS) or similar technology to manage the unsustainable levels of carbon dioxide that will continue to be produced by the nation's rapidly expanding coal-fired

power plants; and iii) the diversification of fuel supply to reduce coal use. Major demand side efficiency gains are most immediate and effective, as they prevent power plants from ever being built in the first place and therefore reduce supply through the accumulation of what Amory Lovins termed “negawatts”. Some form of CCS, despite the enormous costs involved, is necessary because coal-fired power plants in China have grown on an unprecedented scale and most credible projections of electricity generation supply composition predict that even under optimal investment conditions and aggressive climate change policies in China, coal will still account for between 60 and 70 percent of electric power generation by 2020. Lastly, fuel diversification is important to reduce the need for coal conversion that accounts for over 80 percent of total emissions, however it is unclear the extent to which China’s energy system will be able to diversify fuel at any significant scale. Two of the implications raised by this study relate directly to analysis of whether China will be able to mobilize adequate resources to achieve the first and second of these goals.

First, as China’s past illustrates, neo-liberal tools can be marshaled to achieve state-led goals in the energy sector. As a result, there is considerable hope that efficiency gains on the supply and demand side will take place. On the supply side, there is already evidence of this in the advances in boiler technologies and efficiencies being purchased and utilized by China’s electric power plants. The graduated liberalization of coal prices by the central state initially served to attract investment from the local domestic and foreign firms entering the coal industry to meet booming demand. Such price reform also drastically increased the fuel costs of electric power generation firms, creating

considerable incentive to invest in more highly efficient combustion technology – some forms of which also reduce emissions enforcement costs.

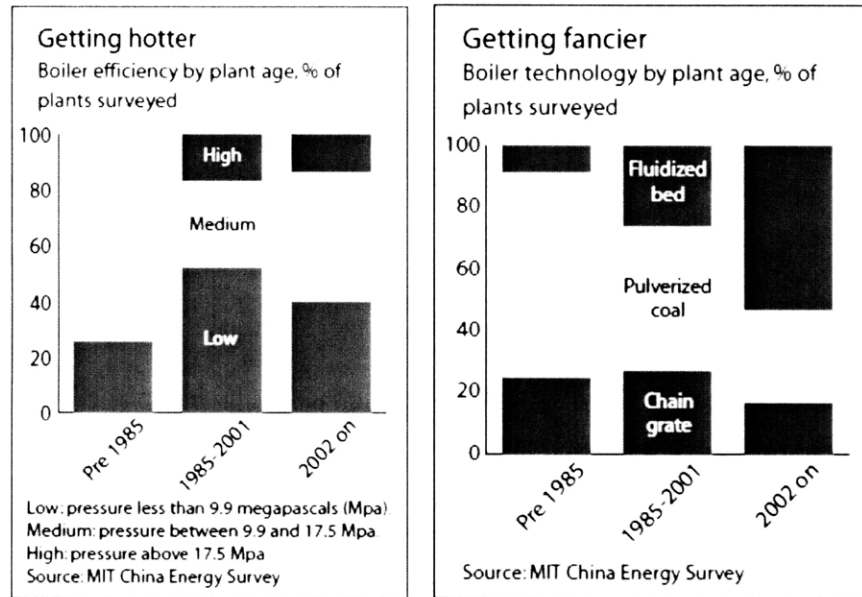
As data from the MIT China Energy Survey illustrate, there is a clear trend in installed boiler technology pressure and type through time. For plants that came online (connected to the grid) between 1985 and 2001, over 50 percent of the plants sampled utilized subcritical boilers with pressures of less than 9.9 Megapascals (MPa). For plants commissioned in 2002 and later, this ratio dropped to under 40 percent.<sup>348</sup> Significantly, fluidized beds were utilized in under 10 percent of the sampled plants commissioned before 1985, and 50 percent of the plants commissioned from 2002 and later. As efficiency is enhanced through the higher pressure and temperature of supercritical boilers, fluidized bed boilers also enhance efficiency by blowing jets of air to suspend the coal that is being combusted. This agitation enables higher efficiency, as it allows more chemical reaction and heat transfer to occur, and also improves emissions rates. The agitation also allows combustion-stage capture of sulfur dioxide and nitrogen oxide emissions, as absorbent chemicals such as dolomite or limestone can mix with the flue gases. This form of capture does not require expensive post-combustion stage add-on controls such as flue-gas desulfurization (FGD) “scrubber” towers. Fluidized bed boilers therefore accomplish both efficiency gains stated of central state policy and aid greatly in the reduction of emissions control enforcement costs, another critical policy goal. FGD scrubbers are often turned off (at least those without continuous emissions monitoring) or simply not installed. Parasitic power loss created by FGD controls is in the range of one to two percent, and operating cost is often in excess of the US\$ 0.0019/kWh (RMB

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<sup>348</sup> Data from MIT China Energy Survey. Edward Steinfeld, Richard Lester, and Edward Cunningham, “Power Plant Emissions: Lessons from Sulfur”, *China Economic Quarterly*, September 2008.

0.015/kWh) subsidy that FGD-compliant plants receive in the price paid to them by the grid.

**Figure 36. Electric Power Generation Boiler Efficiency and Technology**



There is precedence for the ability of the Chinese energy system to engage in significant efficiency improvement. Past gains in energy efficiency have been impressive, and seemingly provide grounds for hope. As has been well documented by others, China's energy intensity (ratio of energy consumption to GDP) dropped rapidly despite major economic growth during the 1980s and 1990s. Instead, between 1980 and 2000 China quadrupled its GDP and only doubled its energy consumption. Vaclav Smil praised such progress:

“The long-term decline of energy/GDP intensities is expected with advancing economic modernization and it has been quite pronounced in both North America and in Western Europe - but the recent Chinese improvements have occurred at an even faster rate. Using the State Statistical Bureau data on energy consumption and inflation-adjusted values of the GDP, the national average of energy intensity was about 0.7 kilograms of coal equivalent (kgce) per 1 *yuan* of GDP; by 1990 the rate had declined to 0.42 kgce/1980 *yuan*, and in 1995 it was

slightly below 0.35 kgce - a bit less than half its value 15 years ago. Such a rate of decline is unmatched by any other major modernizing economy.”<sup>349</sup>

While the changing composition and structure of China’s economy undoubtedly explains one aspect of these gains, others have argued with much empirical support that energy policies (conservation in particular), rather than structural changes in the economy, were the primary driver of efficiency gains after 1980.<sup>350</sup>

The second implication of this study that can be applied to understanding of China’s capacity to reduce greenhouse gas emissions is that the actions of firms clearly influence the impact of major central policy execution, and this creates space for important innovation. This innovation has an impact on both demand side efficiency gains and on the need for investment in carbon storage technologies such as CCS. Environmental technology design and management in China, as well as risk capital for major R+D projects such as CCS are increasingly being provided by corporations seeking to diversify their revenue sources and to profit from perceived shifts in public policy.

An important byproduct of Jinyuan’s corporate rise in Case One was the creation of a large subsidiary to license foreign flue-gas desulfurization (FGD) equipment to coal-fired power plants in Guizhou. This diversification then evolved to the production, operations and management of domestic FGD equipment. The commercial incentive for corporations to provide technological solutions to fulfill China’s environmental policy goals is significant. One need only look to Shenhua, China’s largest coal company, and the firm’s major investments in projects such as the \$3.58 billion CCS facility in Ordos, Inner Mongolia, to understand the importance of such corporate involvement. However,

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<sup>349</sup> Vaclav Smil, “China’s Energy and Resource Uses: Continuity and Change,” *China Quarterly* (1998), p.947.

<sup>350</sup> Xiannuan Lin, *China’s Energy Strategy: Economic Structure, Technological Choices, and Energy Consumption* (Westport, CT Praeger, 1996).

it is striking that the bias of this corporate involvement is still towards supply-side solutions.

*Supporting a “California Effect” vs. Recentralizing Regulatory Institutions*

In historical terms, China’s central state has proven to be a capable risk manager in a critical sector undergoing considerable change. Beijing has been quite successful in coordinating periodic reductions in central state ownership and investment, the lowering of barriers to market access, and the market-friendly revision of terms of contracts, pricing and other aspects of what is arguably the most politically critical sector of the economy. As Zhang and Heller write of the electric power industry: “Where the central government ran up against inefficient state bank lending and macroeconomic limits on state credit expansion, it allowed local governments and some foreign investors to develop a more diverse array of plants to supplement the state core.”<sup>351</sup> Without such reforms in the energy sector, China’s remarkable growth story could not have occurred.

China’s vast geography and regional variation in economic development will in all likelihood require local customization of approaches to climate change mitigation and environmental protection. Many observers credit what (albeit still limited) progress the US has made in this regard to forward-looking state governments legislating local environmental standards that are more stringent than federal standards. David Vogel has written about the “California Effect” and improvements in US federal automobile emissions standards that were nudged along through legislative action in California, a state able to influence the design of car manufacturing through the scale of its auto

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<sup>351</sup> Zhang and Heller, p.107.

market.<sup>352</sup> Decentralized approaches to regulatory reform in the case of the environment can function well, and it is often the wealthier regions with large consumer markets that can provide regulatory momentum.<sup>353</sup> As recent data mapped by Lawrence Berkeley National Laboratory graphically illustrates, China's more wealthy coastal provinces are indeed leading the way in areas such as energy intensity reduction (see Appendix III). However, as Aden and Sinton write: "Gradual adoption of more liberalized energy markets can influence China's EEKC [energy-environmental Kuznets curve] in combination with local political reform: increased economic liberalization without expanded rights or accountability is likely to augment supply-side dominance and an upward-sloping EEKC."<sup>354</sup>

In the context of the current global economic downturn, the diversification reforms of the past, born during periods of high growth and energy shortage, are again being revisited and reversed. In particular, the portfolio of ownership and investment in the energy sector is being reassessed with the creation of the centralizing National Energy Commission, and in other 'back bone' sector such as the airlines, telecommunications, and transportation, central state ownership again appears to be consolidating. The case studies in this dissertation lend considerable credence to this recent trend. However, the strengthening of incumbent SOE firms through consolidation may prove to be highly problematic in meeting the challenges discussed above, given the lack of comprehensive reform in corporate governance, in regulatory independence, as well as in media and legal independence. Firms and local governments pursuing their own economic interests

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<sup>352</sup> David Vogel, *Trading up: Consumer and environmental regulation in a global economy* (Harvard University Press, 1995).

<sup>353</sup> As has been well documented, past reforms of economic liberalization were first experimented at the local level in China and eventually extended nationally.

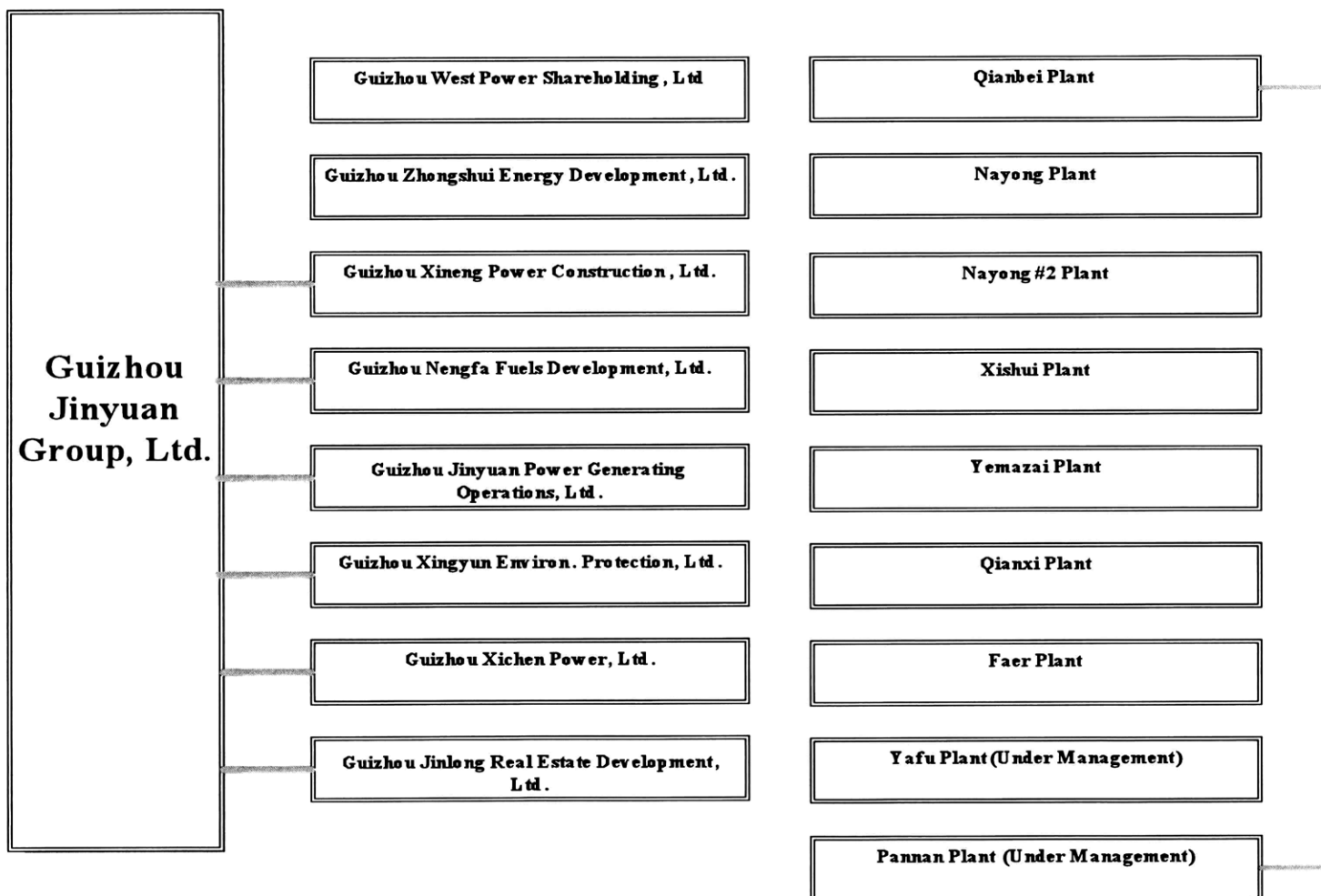
<sup>354</sup> Aden and Sinton, p.268.

on the whole served well the central state's goal of increasing national energy supply throughout the past three decades. These interests do not align in the same manner when the policy goal shifts to other objectives, such as the rapid reduction of energy intensity, energy demand, and the implementation of a national strategy to combat climate change.

APPENDIX I.

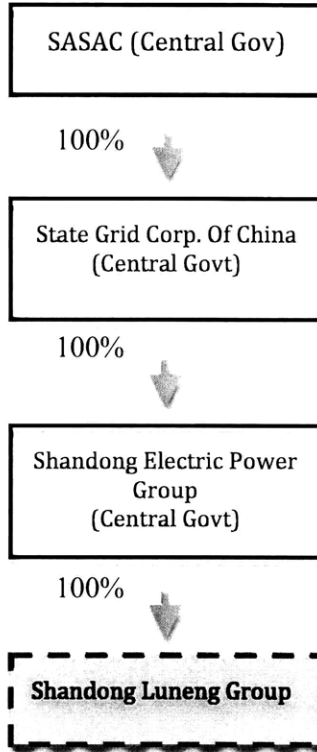
Subsidiaries in which Jinyuan has a Controlling Share

Power Plants Owned or Managed

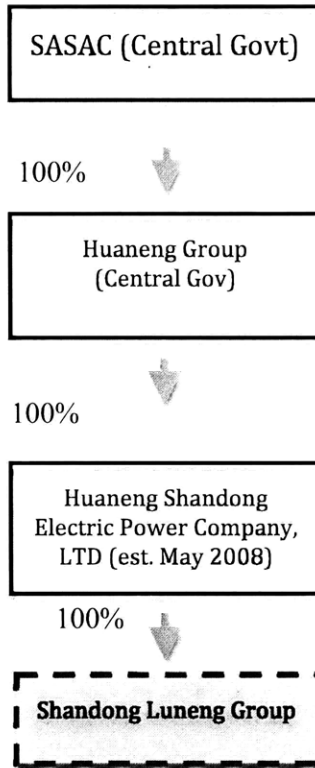


**APPENDIX II.**

**A. Luneng Ownership Matrix, Feb. 2008 – Dec. 2008**

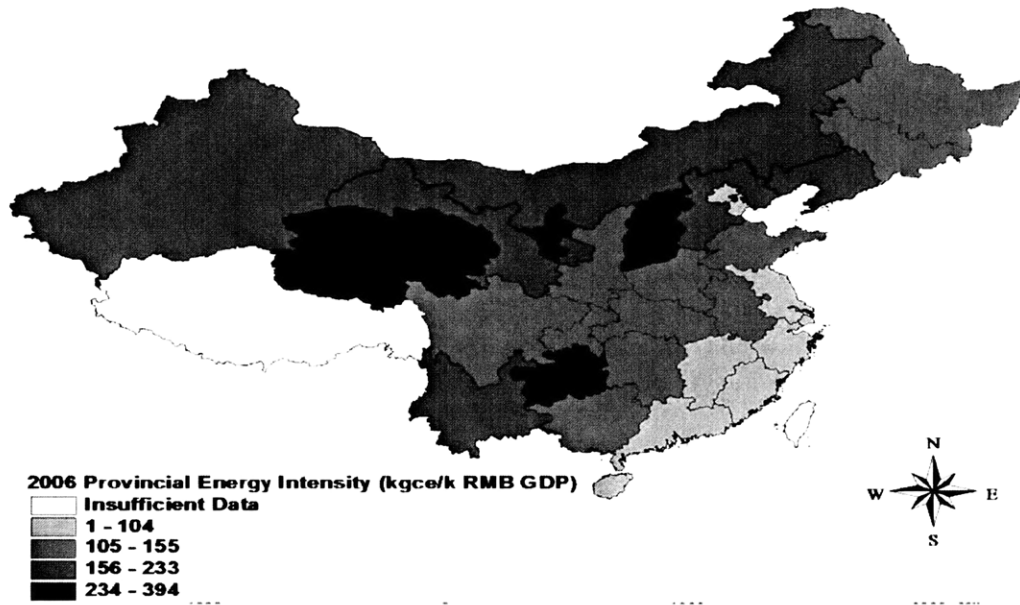


**B. Luneng Ownership Matrix, December 2008 –**



APPENDIX III.

Energy Intensity by Province, 2006



Source: LBNL, China Energy Databook 2008.

## SELECT BIBLIOGRAPHY

- Abdelal, R. *Capital rules: the construction of global finance*. Harvard University Press, 2007.
- Acemoglu, D., J. Johnson, J. A. Robinson, and D. Rodrik. "An African Success Story: Botswana," in D. Rodrik (ed.) *In search of prosperity: Analytic narratives on economic growth*. Princeton University Press, 2003.
- Aden, N. T., and J. E. Sinton. "Environmental implications of energy policy in China." *Environmental Politics* 15, no. 2 (2006): 248-270.
- Allen, W. S. *The Nazi seizure of power: the experience of a single German town, 1930-1935*. Quadrangle Books, 1965.
- Andrews-Speed, P. *Energy policy and regulation in the People's Republic of China*. International energy and resources law and policy series, 19. The Hague: Kluwer Law International : Sold and distributed in North, Central and South America by Aspen Pub., 2004.
- . "China's ongoing energy efficiency drive: Origins, progress and prospects." *Energy Policy* (2009).
- Andrews-Speed, P., and S. Dow. "Reform of China's electric power industry Challenges facing the government." *Energy Policy* 28, no. 5 (2000): 335-347.
- Andrews-Speed, P., S. Dow, and Z. Gao. "The ongoing reforms to China's government and state sector: the case of the energy industry." *Journal of Contemporary China* (2000): 5-20.
- Andrews-Speed, P., G. Ma, B. Shao, and C. Liao. "Economic responses to the closure of small-scale coal mines in Chongqing, China." *Resources Policy* 30, no. 1 (2005): 39-54.
- Andrews-Speed, P., M. Yang, L. Shen, and S. Cao. "The regulation of China's township and village coal mines: a study of complexity and ineffectiveness." *Journal of Cleaner Production* 11, no. 2 (2003): 185-196.
- Andrews-Speed, P., A. Zamora, C. D. Rogers, L. Shen, S. Cao, and M. Yang. "A framework for policy formulation for small-scale mines: the case of coal in China." In *Natural Resources Forum*, 26:45-54. Blackwell Synergy, 2002.
- Arrow, K. J. *Aspects of the theory of risk-bearing*. Yrjö Jahnssonin Säätiö, 1965.
- Bacon, R. W. "Privatization and reform in the global electricity supply industry."

- Annual review of energy and the environment* 20, no. 1 (1995): 119-143.
- Ball, A., A. Hanstead, R. Curtotti and K. Schneider, *China's Changing Coal Industry: Implications and Outlook*, Report 03.3, Australian Bureau of Agricultural and Resource Economics, Canberra, Australia, 2003.
- Bar-Lev, D., and S. Katz. "A Portfolio Approach to Fossil Fuel Procurement in the Electric Utility Industry." *The Journal of Finance* 31, no. 3 (June 1976): 933-947.
- Baum, R. *Burying Mao: Chinese politics in the age of Deng Xiaoping* (Princeton: Princeton University Press, 1994).
- Baumol, W., R. Litan and C. Schramm. *Good capitalism, bad capitalism and the economics of growth and prosperity*. Yale University Press, 2007.
- Beato, P. and J. Laffont (eds.) *Competition policy in regulated industries: Approaches for emerging economies*. The Johns Hopkins University Press, 2002.
- Berger, S., and R. P. Dore, *National diversity and global capitalism*. Cornell University Press. 1996.
- Blackman, A., and X. Wu. "Foreign direct investment in China's power sector: trends, benefits and barriers." *Energy Policy* 27, no. 12 (1999): 695-712.
- Blume, M. E. "On the assessment of risk." *Journal of Finance* (1971): 1-10.
- Breznitz, Dan. *Innovation and the state: Development strategies for high-technology industries in a world of fragmented production: Israel, Ireland, and Taiwan*. Yale University Press 2007.
- British Petroleum, *BP Statistical Review of World Energy*, 2008.
- Broadman, H. G. "The business(es) of the Chinese state." World Bank Paper.
- Brugger, B. and D. Kelly. *Chinese Marxism in the post-Mao era*. Stanford University Press, 1990.
- Brune, N., and A. Guisinger. "Myth OR Reality? The Diffusion OF Financial Liberalization IN Developing Countries." *Yale University MacMillan Center Working Paper (New Haven, Connecticut, Yale University)* (2007).
- Burawoy, M. "The state and economic involution: Russia through a China lens." *World Development* 24, no. 6 (1996): 1105-1117.

- CCP Central Committee Circular, “Zhonggong zhongyang guanyu guoyou qiye gaige he fazhan ruogan zhongda wenti de jue ding”, Fourth Plenum of 15<sup>th</sup> Chinese Communist Party Congress, September 22, 1999.
- Caijing, “Buyout Unplugs Another ESOP Power Firm”, January 7, 2009.
- Cao, L. “Chinese Privatization: Between Plan and Market.” *Law and Contemporary Problems* 63 (2000): 13.
- Capoor, K., P. Ambrosi, International Emissions Trading Association, World Bank, and C. F. Business. *State and Trends of the Carbon Market, 2007*. World Bank Carbon Finance Unit, 2007.
- Chaudhry, K. A. “Economic liberalization and the lineages of the rentier state.” *Comparative Politics* (1994): 1-25.
- Cheema, G. S., and D. A. Rondinelli. *Decentralization and development: Policy implementation in developing countries; Decentralization and development: Policy implementation in developing countries*. Sage Publications, 1983.
- Chen, F. *Economic transition and political legitimacy in post-Mao China: ideology and reform*. State University of New York Press, 1995.
- Chen, Q. *Zhongguo kechixu nengyuan*. Kexue chubanshe, 2007.
- . *Zhongguo nengyuan fazhan zhanlue yu zhengce yanjiu*. Jingji kexue chubanshe, 2004.
- Chen, S. “Motivations behind China’s Foreign Oil Quest: A Perspective from the Chinese Government and the Oil Companies.” *Journal of Chinese Political Science* 13, no. 1 (2008): 79-104.
- China Electricity Council, “2008 nian quanguo dianli gongye tongji kuaibao yilanbiao” 2009.
- China Daily, “China names key industries for absolute state control”. December 19, 2006.
- Chow, D. C. K. “An Analysis of the Political Economy of China's Enterprise Conglomerates: A Study of the Reform of the Electric Power Industry in China..” *Law and Policy in International Business* 28, no. 2 (1997).
- Chun, L. “Against privatization in China: a historical and empirical argument.” *Journal of Chinese Political Science* 13, no. 1 (2008): 1-27.
- . “Challenging Privatization: A Conceptual and Theoretical Argument.” *Journal*

*of Chinese Political Science* 14, no. 1 (2009): 21-48.

Clark, W. and T. Bradshaw. *Agile energy systems: Global lessons from the California energy crisis*. Elsevier, 2004.

Congressional Research Services (CRS), C. R. S. "China's Greenhouse Gas Emissions and Mitigation Policies" (September 10, 2008).

Cook, S., J. Zhuang, and S. Yao. *The Chinese economy under transition*. Macmillan, 2000.

Culpepper, P. D. "Single Country Studies and Comparative Politics."

Dahe Ribao, "Qi da hangye bixu you guozi kongzhi, qi da hangye baokuo jungong, dianwang dianli, shiyou shihua, dianxin, meitan, minhang, hangyun"  
December 19, 2006.

Dahl, R. A. *Who governs? Power and democracy in an American city*. New Haven: Yale University Press, 1961.

Dorian, J. *Minerals, energy, and economic development in China*. Clarendon Press, 1994.

Downes, C. "Functional Explanations and Intentions." *Philosophy of the Social Sciences* 6, no. 3 (1976): 215.

Downs, E. "Energy Security Series: China." *The Brookings Foreign Policy Studies* (2006).

---. *China's quest for energy security*. Rand Corporation, 2000.

---. "The Chinese energy security debate." *The China Quarterly* 177 (2004): 21-41.

---. *The fact and fiction of Sino-African energy relations*. Brookings Institution, 2007.

Duckett, J. "Bureaucrats in Business, Chinese-Style: The Lessons of Market Reform and State Entrepreneurialism in the People's Republic of China." *World Development* 29, no. 1 (2001): 23-37.

Ebel, R. E. *China's Energy Future: The Middle Kingdom Seeks Its Place in the Sun*. Center for Strategic & International Studies, 2005.

Eckstein, H. "Case studies and theory in political science." in *Handbook of political Science*, v.ii: *Political Science; Scope and Theory*, ed. F.I. Greenstein and N.W. Polsby (Reading, MA: Addison-Wesley, 1975), pp. 79-133.

- Eichengreen, B. J., Y. C. Park, C. Wyplosz, R. N. Cooper, W. J. McKibbin, R. E. Baldwin, I. Cheong, C. Dupont, D. Huang, and R. Z. Lawrence. *China, Asia, and the new world economy*. Oxford University Press, 2008.
- Ekelund, R. B., and R. D. Tollison. "Robert H. Bates, Avner Greif, Margaret Levi, Jean-Laurent Rosenthal and Barry R. Weingast, Analytic Narratives." *Public Choice* 115, no. 3 (2003): 490-494.
- Encarnation, D. *Dislodging multinationals: India's strategy in comparative perspective*. Cornell University Press, 1989.
- Evans, P. C., and E. S. Downs. *Untangling China's Quest for Oil through State-Backed Financial Deals*. Brookings Institution, 2006.
- Fesharaki, F., and K. Wu. "Revitalizing China's Petroleum Industry Through Reorganization: Will It Work?." *Oil & gas journal* 96, no. 32 (1998).
- Fewsmith, J. *Elite politics in contemporary China*. East Gate Book, 2000.
- . "China and the WTO: The Politics Behind the Agreement," National Bureau of Research (NBR) Analysis 10:5, Essay 2 (November 1999).
- Findlay, R. "The new political economy: its explanatory power for LDCs" *Economics & Politics* 2, no. 2 (1990): 193-221.
- . *Is the new political economy relevant to developing countries?* Country Economics Dept., World Bank, 1989.
- Foster, C. D. *Privatization, public ownership, and the regulation of natural monopoly*. Blackwell Publishers, 1992.
- Fox, J. *Managing business-government relations: Cases and notes on business-government problems*. Richard D. Irwin, Inc., 1982.
- Frye, T., and A. Shleifer. *The Invisible Hand and the Grabbing Hand*. National Bureau of Economic Research, 1996.
- Fukuyama, F. *State-building: Governance and world order in the 21<sup>st</sup> century*. Cornell University Press, 2004.
- Gamble, A. *The free economy and the strong state: The politics of Thatcherism*, (Durham: Duke University Press, 1988).
- Gan, L. "Energy development and environmental constraints in China." *Energy Policy* 26, no. 2 (1998): 119-128.

- Gerschenkron, A. *Economic backwardness in historical perspective: A book of essays*. Belknap Press, 1962.
- George, A. L., and A. Bennett. *Case studies and theory development in the social sciences*. MIT Press, 2005.
- Gerring, J. "What is a Case Study and What is it Good for?." *American Political Science Review* 98, no. 02 (2004): 341-354.
- Gilardi, F. "The Institutional Foundations of Regulatory Capitalism: The Diffusion of Independent Regulatory Agencies in Western Europe." *The ANNALS of the American Academy of Political and Social Science* 598, no. 1 (March 1, 2005): 84-101.
- Goodman, D. "The politics of the West: Equality, nation-building and colonization," *Provincial China* 7, no. 2 (2002): 127–150.
- . "The Campaign to "Open Up the West": national, provincial-level and local perspectives," *The China Quarterly* 178 (2004): 317–334.
- Greene, M. "The Government as an Insurer." *The Journal of Risk and Insurance* 43, no. 3 (September 1976): 393-407.
- Gregor, A. J. "Political science and the uses of functional analysis." *The American Political Science Review* (1968): 425-439.
- Gruettner, A. "Regulations Irk Suppliers." *China Business Review* 30 (1997).
- Gu, M. *Understanding Chinese company law*. Hong Kong University Press, 2006.
- Guizhou Electricity Industry Association. *Guizhou Electric Power Yearbook*. (various years).
- Guo, S. "The Ownership Reform in China: what direction and how far?." *Journal of Contemporary China* 12, no. 36 (2003): 553-573.
- Guo J. "Jinyuan jituan shangbannian 200yi dianliang 'xidian dongsong'", *Zhongguo Dianli Xinwen Wang*, July 18, 2006.
- Haggard, S. and R. Kaufman, *The Politics of Economic Adjustment: International Constraints, Distributive Conflicts, and the State*. Princeton University Press, 1992.
- Hall, P. A., and D. W. Soskice. *Varieties of capitalism: The institutional foundations of comparative advantage*. Oxford University Press, USA, 2001.

- Hassard, J., J. Morris, and J. Sheehan. "The elusive market: privatization, politics and state-enterprise reform in China." *British Journal of Management* 13 (2002): 221-231.
- Heffernan, V. "Home Economics." *The New York Times*, May 24, 2009, sec. Magazine. [http://www.nytimes.com/2009/05/24/magazine/24wwln-medium-t.html?\\_r=1&scp=1&sq=mint.com&st=cse](http://www.nytimes.com/2009/05/24/magazine/24wwln-medium-t.html?_r=1&scp=1&sq=mint.com&st=cse).
- Hempel, C. G. "The logic of functional analysis." *Readings in the Philosophy of Social Science* (1959): 349-375.
- Hibou, B. "From privatizing the economy to privatizing the state" in Beatrice Hibou (ed.), *Privatizing the state*. Columbia University Press, 2004.
- Hirsh, R. *Power loss: the origins of deregulation and restructuring in the American electric utility system* (Cambridge: MIT Press, 1999).
- Holt, R. "A Proposed Structural-Functional Framework for Political Science." *Functionalism in the Social Sciences: The Strength and Limits of Functionalism in Anthropology, Economics, Political Science, and Sociology*, ed. D. Martindale 84: 110.
- Hsueh, L., C. Hsu and D. Perkins. *Industrialization and the state: The changing role of the Taiwan government in the economy, 1945-1998*. Harvard University Press, 2001.
- Hu, A. "Zhongguo zhengce zhouqi yu jingji zhouqi", *Chinese Social Sciences Quarterly* 8 (1994); pp.85-100.
- , "Ertan shuidian xiangmu yanzhong kuisun de yanjiu baogao", *Zhongguo guoqing fenxi yanjiu baogao*, vol 27, 2000.
- Huang, Y. *Capitalism with Chinese characteristics: entrepreneurship and the state*. Cambridge Univ Pr, 2008.
- . "One country, two systems: Foreign-invested enterprises and domestic firms in China." *China Economic Review* 14, no. 4 (2003): 404-416.
- . *Selling China: foreign direct investment during the reform era*. Cambridge University Press, 2003.
- Huang, Y., and R. Duncan. "How successful were China's state sector reforms?." *Journal of Comparative Economics* 24, no. 1 (1997): 65-78.
- . *Reform of State-owned Enterprises in China: Autonomy, Incentive and*

- Competition*. Asia Pacific Press, 1998.
- Jaffe, A. M., and S. W. Lewis. "Beijing's oil diplomacy." *Survival* 44, no. 1 (2002): 115-134.
- Jakobson, L., and Z. Daojiong. "China and the Worldwide Search for Oil Security." *Asia-Pacific Review* 13, no. 2 (2006): 60-73.
- Jiang, W. *Fueling the Dragon: China's Quest for Energy Security and Canada's Opportunities*. Asia Pacific Foundation of Canada, 2005.
- Jiang, W., E. Teo, M. Andrew, and R. Lim. "The Unocal Bid: China's Treasure Hunt of the Century." *China Brief* 5, no. 16 (2005): 1-2.
- Jin L. "Wo Kan Jinyuan", *Zhongguo Dianli Qiye Guanli*, April, 2005.
- Jinyuan Group, "Yixin yiye meifazhan, 2008 nian jinyuan jituan gongsi xinnian heci", January 2008.
- Johnson, C. A. *MITI and the Japanese miracle: the growth of industrial policy, 1925-1975*. Stanford University Press, 1982.
- Johnston, A. I. "Is China a Status Quo Power?." *International Security* 27, no. 4 (2003): 5-56.
- Jordana, J., and D. Levi-Faur. "The Diffusion of Regulatory Capitalism in Latin America: Sectoral and National Channels in the Making of a New Order." *The ANNALS of the American Academy of Political and Social Science* 598, no. 1 (March 1, 2005): 102-124.
- Kang Y., and Liu Weixun, "List of key Chinese subsidiaries 'Not For Sale' being drafted" *Economic Observer* (January 19, 2009).
- Kaufman, H. "The Forest Ranger." *Soil Science* 89, no. 6 (1960): 360.
- Lau, L.J., Y. Qian, and G. Roland, "Reform without losers: An interpretation of China's dual-track approach to transition," *Journal of Political Economy* 108, no. 1 (2000): 120-143..
- Lawrence Berkeley National Laboratory, *China Energy Databook*. 2008.
- Lee, K. "An assessment of the state sector reform in China: Viability of 'legal person socialism'." *Journal of the Asia Pacific Economy* 1, no. 1 (1996): 105-121.
- Lees, C. "We Are All Comparativists Now: Why and How Single-Country Scholarship Must Adapt and Incorporate the Comparative Politics

- Approach.” *Comparative Political Studies* 39, no. 9 (2006): 1084.
- Lester, R. and E. Steinfeld, “The Coal Industry in China”, Working Paper, MIT-ICP-07-001, 2008.
- Levi-Faur, D. “The Global Diffusion of Regulatory Capitalism.” *The ANNALS of the American Academy of Political and Social Science* 598, no. 1 (March 1, 2005): 12-32.
- Levy, J. D. *The state after statism: new state activities in the age of liberalization*. Harvard University Press, 2006.
- Lewis, J. “China's Strategic Priorities in International Climate Change Negotiations.” *Washington Quarterly* 31, no. 1 (December 1, 2007): 155-174.
- Li, B., and J. P. Dorian. “Change in China's power sector.” *Energy policy* 23, no. 7 (1995): 619-626.
- Li, C. “China in 1999: Seeking Common Ground at a Time of Tension and Conflict”, *Asian Survey*, 40:1 (2000), p.122.
- Li, D. and C. Wu, “Reforming state-owned enterprises: Diversifying ownership versus improving management”, *The Management of Enterprises in the People's Republic of China* (2002) in Anne Tsui and Chung-ming Lau (eds.), *The management of enterprises in the People's Republic of China*, Kluwer Publishing, 2002.
- Li, M. and Y. Wong, “Diversification and Economic Performance: An Empirical Assessment of Chinese Firms,” *Asia Pacific Journal of Management* 20, no. 2 (June 1, 2003): 243-265.
- Lieberthal, K., and M. Herberg. *China's Search for Energy Security: Implications for US Policy*. National Bureau of Asian Research, 2006.
- , Dept. of Commerce, and United States. *Bureaucratic Politics and Chinese Energy Development*. US Department of Commerce, International Trade Administration, 1986.
- . *Policy making in China : leaders, structures, and processes*. Princeton, N.J.: Princeton University Press, 1988.
- Lijphart, A. “Comparative politics and the comparative method.” *The American Political Science Review* (1971): 682-693.
- Lindbeck, A. “Economic and social interaction in China.” *Economics of Transition* 16, no. 1 (2008): 113-139.

- Lindblom, C. "The Science of "Muddling Through"." *Public Administration Review* 19, no. 2 (Spring 1959): 79-88.
- Liu, J. *Zhongguo dianli chanye zhengce yu chanye fazhan*. Zhongguo dianli chubanshe, 2006.
- Lowi, T. "Toward functionalism in political science: the case of innovation in party systems." *The American Political Science Review* (1963): 570-583.
- Lu, X. *Zhongguo dianli yu meitan*. Meitan gongye chubanshe, 2004.
- Luo, G. "Explanation of Plan for Institutional Restructuring of the State Council", *Ta Kung Pao*, March 7, 1998.
- Ma, S. "The Chinese Route to Privatization: The Evolution of the Shareholding System Option." *Asian Survey* 38, no. 4 (April 1998): 379-397.
- Magee, D. "Powershed Politics: Yunnan Hydropower under Great Western Development." *The China Quarterly* 185 (2006): 23-41.
- Markowitz, H. "Portfolio selection." *Journal of finance* (1952): 77-91.
- . "Foundations of portfolio theory." *Journal of Finance* (1991): 469-477.
- Martindale, D. *Functionalism in the social sciences: the strength and limits of functionalism in anthropology, economics, political science, and sociology*. American Academy of Political and Social Science, 1965.
- Martínez-de-Albéniz, V., and D. Simchi-Levi. "A portfolio approach to procurement contracts." *Production and Operations Management* 14, no. 1 (2005): 90-114.
- Marx, K., and F. Engels. *Karl Marx and Frederick Engels: selected works in one volume*. International Publishers, 1968.
- Mertha, A. *China's Water Warriors: Citizen Action and Policy Change*. Cornell University Press, 2008.
- Meseguer, C. "Rational learning and bounded learning in the diffusion of policy innovations." *Rationality and Society* 18, no. 1 (2006): 35.
- . "Policy Learning, Policy Diffusion, and the Making of a New Order." *The Annals of the American Academy of Political and Social Science* 598, no. 1 (March 1, 2005): 67-82.

- Ministry of Electric Power, "Expanding the Scale and Use of Foreign Investment to Accelerate Electric Power Development", September 10, 1993. Document 341.
- . Notice "Provisional measure transforming all budgetary infrastructure fund allocations into loans", December 27, 1984. Document 84.
- . Notice "Central government and State Council leaders' memo on questions relating to the utilization of foreign financing to speed the building of electric power", February 26, 1985. Document 54.
- Mitnick, B. *The political economy of regulation: Creating, designing, and removing regulatory forms*. Columbia University Press, 1980.
- Moss, D. A. *When all else fails: government as the ultimate risk manager*. Harvard University Press, 2002.
- Nakagane, K. "SOE Reform and Privatization in China."
- . "SOE Reform and Privatization in China: A note on several theoretical and empirical issues" (2000).
- National Bureau of Statistics (NBS). *China Economic Yearbook*, (various years).
- . *China Energy Yearbook*. (various years).
- . *China Electric Power Yearbook*. (various years).
- . *China Coal Yearbook*. (various years).
- . *Guizhou Statistical Yearbook*. (various years).
- . *Shandong Statistical Yearbook*. (various years).
- Naughton, B. *Growing out of the plan: Chinese economic reform, 1978-1993*. Cambridge Univ Pr, 1995.
- . "Selling Down the State Share: Contested Policy, New Rules", *China Leadership Monitor*, No.1, Part 2, March 2002.
- . "SASAC Rising", *China Leadership Monitor*, No.14 Spring 2005
- . "Top-Down Control: SASAC and the Persistence of State Ownership in China", draft conference paper, June 26, 2006.
- Nolan, P., and W. Xiaoqiang. "Harbin Power Equipment Company: The Battle for

- the Chinese Market.” *Cambridge: Department of Applied Economics, University of Cambridge* (1996).
- Nolan, P., and J. Zhang. “Globalization Challenge for Large Firms from Developing Countries: China’s Oil and Aerospace Industries.” *European Management Journal* 21, no. 3 (2003): 285-299.
- Nolan, P. “China and the global business revolution.” *Camb. J. Econ.* 26, no. 1 (January 1, 2002): 119-137.
- Nolan, P., and H. Rui. “Industrial Policy and Global Big Business Revolution: the Case of the Chinese Coal Industry 1..” *Journal of Chinese Economic & Business Studies* 2, no. 2 (May 2004): 97-113.
- Nordhaus, W. “The Political Business Cycle”, *Review of Economic Studies* 42 (1975); pp.169-89.
- Oakes, T. “Building a Southern Dynamo: Guizhou and State Power.” *The China Quarterly* 178 (2004): 467-487.
- Oi, J. “Fiscal Reform and the Economic Foundations of Local State Corporatism in China.” *World Politics* 45, no. 1 (1992): 99-126.
- . *Rural China Takes Off: Institutional Foundations of Economic Reform*. University of California Press, 1999.
- . *State and Peasant in Contemporary China: The Political Economy of Village Government*. University of California Press, 1991.
- . “The Role of the Local State in China's Transitional Economy.” *China Quarterly* (1995): 1132-1149.
- . “Two Decades of Rural Reform in China: An Overview and Assessment.” *China Quarterly* (1999): 616-628.
- Olsen, R. F., and L. M. Ellram. “A portfolio approach to supplier relationships.” *Industrial Marketing Management* 26, no. 2 (1997): 101-113.
- Osborne, P., and T. Gaebler. *Reinventing government: How the entrepreneurial spirit is transforming the public sector*. (Reading, MA: Addison-Wesley 1992).
- Pearson, M. “Regulation and Regulatory Politics in China’s Tiered Economy.” *Conference Paper* (2006).
- Pearson, M. “Governing the Chinese Economy: Regulatory Reform in the Service of the State.” *Public Administration Review* 67, no. 4 (2007): 718-730.

- Pei, M. *China's trapped transition: The limits of developmental autocracy*. Harvard University Press, 2006.
- Pirog, R. Congressional Research Services, "Oil Industry Profit Review 2007", CRS Report RL34437, April 4, 2008, p.2.
- Po, L. "Redefining Rural Collectives in China: Land Conversion and the Emergence of Rural Shareholding Co-operatives." *Urban Stud* 45, no. 8 (July 1, 2008): 1603-1623.
- Potter, P. B. "Globalization and economic regulation in China: selective adaptation of globalized norms and practices." *Washington University Global Studies Law Review* 2, no. 1 (2003): 119-50.
- Pressman, J.L, and A Wildavsky. *Implementation*. Berkeley: University of California Press, 1973.
- Putnam, R. D. *Making Democracy Work, with Robert Leonardi and Raffaella Y. Nanetti*. Princeton: Princeton University Press, 1993.
- Qian, A. X. "Riding Two Horses: Corporatizing Enterprises and the Emerging Securities Regulatory Regime in China." *UCLA Pacific Basin Law Journal* 12 (1993): 62.
- Qian, Y. "Government control in corporate governance as a transitional institution: lessons from China." *Rethinking the East Asian Miracle* (2001): 295-321.
- Qian, Y., and J. Stiglitz. "Institutional innovations and the role of local government in transition economies: the case of Guangdong province of China." *Reforming Asian Socialism: The Growth of Market Institutions* (1996): 175-193.
- Rodrik, D. "In Search of Prosperity: Analytical Narratives on Economic Growth."
- Rondinelli, D., J. Nellis, and G. S. Cheema. "Decentralization in developing countries." *World Bank Staff Working Paper* 581 (1984).
- Rondinelli, D. "Government decentralization in comparative perspective: theory and practice in developing countries." *International Review of Administrative Sciences* 47, no. 2 (1980): 133.
- . "Decentralizing Governance: Emerging Concepts and Practices, edited by G. Shabbir Cheema and Dennis A. Rondinelli." February 2, 2008.

- Rozelle, S., A. Park, J. Huag and H. Jin. "Liberalization and rural market integration in China," *American Journal of Agricultural Economics* (1997): 635–642.
- Rufin, C. *The political economy of institutional change in the electricity supply industry: shifting currents*. Edward Elgar Publishing, 2003.
- Sachs, J.D. and W. T. Woo. "Understanding China's economic performance," *Journal of Economic Policy Reform* 4, no. 1 (2000).
- Saich, T. *Governance and politics of China*. Palgrave New York, 2001.
- . "The Blind Man and the Elephant: Analysing the Local State in China." *On the Roots of Growth and Crisis: Capitalism, State and Society in East Asia* (2002): 75–99.
- Samuels, R. *The business of the Japanese state: energy markets in comparative and historical perspective*. Cornell University Press, 1987.
- SASAC. Guanyu tuijin guoyou ziben tiaozheng he guoyou qiye chongzu de zhidao yijian". Available at: <http://www.sasac.gov.cn/gzjg/xcgz/200612180138.htm>.
- State Council Office of Economic Restructuring. 'Zhongguo dianli jianguan jigou jianshe yanjiu baogao', November 2004, p. 150.
- Sargeson, S., and J. Zhang. "Reassessing the Role of the Local State: A Case Study of Local Government Interventions in Property Rights Reform in a Hangzhou District." *The China Journal*, no. 42 (July 1999): 77-99.
- Schumpeter, J. A. *Capitalism, socialism and democracy*. Routledge, 1994.
- Shandong Electricity Industry Association, *Shandong Electric Power Yearbook*, (various years).
- Shao, S. "China: power sector regulation in a socialist market economy: World Bank Discussion Paper No 361." *World Bank, Washington, DC* (1997).
- Sharpe, W. F. "A simplified model for portfolio analysis." *Management science* (1963): 277-293.
- Shen, L., and Andrews-Speed, P. "Economic analysis of reform policies for small coal mines in China." *Resources Policy* 27, no. 4 (December 2001): 247-254.
- Shepherd, W. *Public policies toward business*. Richard D. Irwin, Inc., 1985.
- Shih, V. C. *Factions and finance in China: elite conflict and inflation*. Cambridge University Press, 2007.

- Shirley, M. M. "Bureaucrats in business: the roles of privatization versus corporatization in state-owned enterprise reform." *World Development* 27, no. 1 (1999): 115-136.
- Sinocast. "Luneng Clear Employee Ownership.", August 3, 2006.
- Smil, V. "China's Energy and Resource Uses: Continuity and Change." *China Quarterly* (1998): 935-951.
- . *Energy in China's Modernization: Advances and Limitations*. ME Sharpe, 1988.
- State Council Notice, 'Provisional Regulation on the Encouragement of Fundraising for Power Construction Investment and Implementation of the Multi-Rate Power Tariff'. April 17, 1986. Document 86.
- State Electricity Regulatory Commission. *Dianli jianguan gongzuo zhengce fagui xuanbian*. Zhongguo dianli chubanshe. (various years).
- State Grid Corporation of China. *Dianli gongye xiangguan shuishou falu fagui huibian*. Zhongguo dianli chubanshe, 2007.
- State Grid Corporation of China. *Dianwang guoyou zichan guanli zhidu huibian*. Zhongguo dianli chubanshe, 2006.
- Steinfeld, E. *Forging reform in China: The fate of state-owned industry*. Cambridge University Press, 2000.
- , "Energy Policy," in Yusuf, S. and T. Saich (eds.), *China Urbanizes: Consequences, Strategies, and Policies*. World Bank, 2007.
- Steinfeld, E., R. Lester and E. Cunningham, "Greener plants, grayer skies? A report from the front lines of China's energy sector," *Energy Policy* 37, no. 5 (2009): 1809–1824.
- Stephens, J. "The Logic of Functional and Systems Analyses in Political Science." *Midwest Journal of Political Science* (1969): 367-394.
- Stern, J., and S. Holder. "Regulatory governance: criteria for assessing the performance of regulatory systems An application to infrastructure industries in the developing countries of Asia." *Utilities Policy* 8, no. 1 (1999): 33-50.
- Stiglitz, J. *Whither Socialism?* MIT Press, 1994.
- Thomson, E. "Reforming China's coal industry." *China Quarterly* (1996): 726-750.

- . *The Chinese Coal Industry: An Economic History*. Routledge, 2003.
- Toninelli, P. "From private to public to private again: a long-term perspective on nationalization." *Análise social* 43, no. 189 (2008): 675.
- . "Energy supply and economic development in Italy: the role of the state-owned companies."
- Trebat, T. *Brazil's state-owned enterprises: A case-study of the state as entrepreneur*. Cambridge University Press, 1983.
- Tufte, E. *Political Control of the Economy* (Princeton: Princeton University Press, 1978).
- US Department of Energy. *Comprehensive National Energy Strategy*. Department of Energy, 1998.
- . *International Energy Outlook 2006*.
- Van Evera, S. *Guide to methods for students of political science*. Cornell University Press, 1997.
- Van Sambeek, E. J. *Institutional Framework of the Chinese Power Sector*. ECN-C-01-071, October 2001
- Vogel, D. *Trading up: Consumer and environmental regulation in a global economy*. Harvard University Press, 1995.
- Vogel, S. *Freer markets, more rules: Regulatory reform in advanced industrial countries*. Cornell University Press, 1996.
- Walder, A. G. "Local Governments as Industrial Firms: An Organizational Analysis of China's Transitional Economy." *American Journal of Sociology* 101, no. 2 (1995): 263.
- Wang, B. "An imbalanced development of coal and electricity industries in China." *Energy Policy* 35, no. 10 (2007): 4959-4968.
- Wang, D., and Y. Lu. "Roles and prospect of nuclear power in China's energy supply strategy." *Nuclear Engineering and Design* 218, no. (November 2003): 3-12.
- Wang, S. Q., R. L. K. Tiong, S. K. Ting, and D. Ashley. "Risk management framework for BOT power projects in China." *Journal of Project Finance* 4, no. 4 (1999): 56-67.

- Wang, Y. *Energy in China: Transportation, Electric Power and Fuel Markets*. Asia Pacific Energy Research Centre, 2004.
- Wee, S., and K. Wee. "Foreign Projects in China's Power Industry: Tariff Reductions and Renegotiations." *The Electricity Journal* 16, no. 6 (2003): 54-65.
- Wei, Y. *Zhongguo nengyuan baogao (2006)*. Kexue Chuanshe. 2006.
- Weiss, T. G. "Governance, good governance and global governance: conceptual and actual challenges." *Third World Quarterly* 21, no. 5 (2000): 795-814.
- Wellisz, S., and R. Findlay. "The State and the invisible hand" *The World Bank Research Observer* 3, no. 1 (1988): 59-80.
- Williams, J. H., and N. K. Dubash. "Asian electricity reform in historical perspective." *Pacific Affairs* (2004): 411-436.
- . "Special issue on the political economy of electricity reform in Asia." *Pacific Affairs* 77 (2004): 3.
- Williams, J. H., and R. Ghanadan. "Electricity reform in developing and transition countries: A reappraisal." *Energy* 31, no. 6-7 (2006): 815-844.
- Woo, "China's Electric Power Market: The Rise and Fall of IPPs", (PESD Working Paper No.45), August 16, 2005.
- Wood, A. "Joint stock companies with rearranged public ownership: What can we learn from recent Chinese and East European experience with state enterprises?" *China Economic Review* 4, no. 2 (1993): 181-193.
- Woodard, K. *The international energy relations of China*. Stanford University Press, 1980.
- World Trade News, - China Likely to Approve Power Deals...." *Financial Times*, November 24, 1994.
- Xiang D. (ed.) *Dakuayue: Guizhou Dianli Jueqi*, Guizhou renmin chubanshe, 2007.
- Xiao, J. "Luneng zhi yuan", in *Dianqi Shidai*. Dianqiyeshi chubanshe, vol. 6. 2002.
- Xu, L. C., T. Zhu, and Y. Lin. "Politician control, agency problems and ownership reform: Evidence from China." *Economics of Transition* 13, no. 1 (2005): 1-24.
- Xu, Y. "A powerhouse reform: conversion from the Ministry of Electric Power to

- the State Power Corporation of China.” *Australian Journal of Political Science* 36, no. 1 (2001): 123.
- . *Powering China: reforming the electric power industry in China*. Ashgate Publishing, 2002.
- . *Electricity reform in China, India and Russia: the World Bank template and the politics of power*. Edward Elgar, 2004.
- Yang, D. *Remaking the Chinese leviathan: Market transition and the politics of governance in China*. Stanford University Press, 2005.
- Yang, M. *Zhongguo dianli shichanghua gaige jiqi quyue wenti yanjiu*. Zhongguo jingji chubanshe, 2004.
- Yang, X. “Theories of property rights and China's reforms.” *China Economic Review* 4, no. 2 (1993): 195-212.
- Yeh, E. T., and J. I. Lewis. “State power and the logic of reform in China's electricity sector.” *Pacific Affairs* (2004): 437-465.
- Yeoh, B. S., and R. Rajaraman. “Electricity in China: The latest reforms.” *The Electricity Journal* 17, no. 3 (2004): 60-69.
- Yin, R. K. “The case study crisis: some answers.” *Administrative Science Quarterly* (1981): 58-65.
- Yusuf, S. and T. Saich (eds.), *China Urbanizes: Consequences, Strategies, and Policies*. World Bank, 2007.
- Zha, D. “China's energy security: Domestic and international issues.” *Survival* 48, no. 1 (2006): 179-190.
- Zhang, C., and T. C. Heller. “Reform of Chinese electric power market: economics and institutions.” *The Political Economy of Power Sector Reform: The Experiences of Five Major Developing Countries* (2007): 76.
- Zhang, D. *Zhongguo guoyou zichan jianguan guanli nianjian*. Zhongguo jingji chubanshe, 2007.
- Zhengquan Shibao, “Guangning fazhan gongbao zhengwen di 000537 hao: ‘Xiangcai zhengquan youxianzeren gongsi guanyu tianjin kai gede gufen youxianzeren gongsi zhongda zichan goumai youguan qingkuang zhi hecha baodao’”, November 26, 2004.

Zhongguo jingji jingqi jiance zhongxin (ed.) *Zhongguo chanye ditu – nengyuan 2004-5*. Shehui kexue wenxian chubanshe, 2006.

Zhou, X (ed.) *Zhongguo dianli gongye guihua*, Shuidian chubanshe, 2007.

Zhu, Tian. “China's Corporatization Drive: An Evaluation And Policy Implications.” *Contemporary Economic Policy* 17, no. 4 (1999): 530-9.

Zweig, D., and J. Bi. “China's Global Hunt for Energy.” *Foreign Affairs* 84, no.5 (2005): 25.